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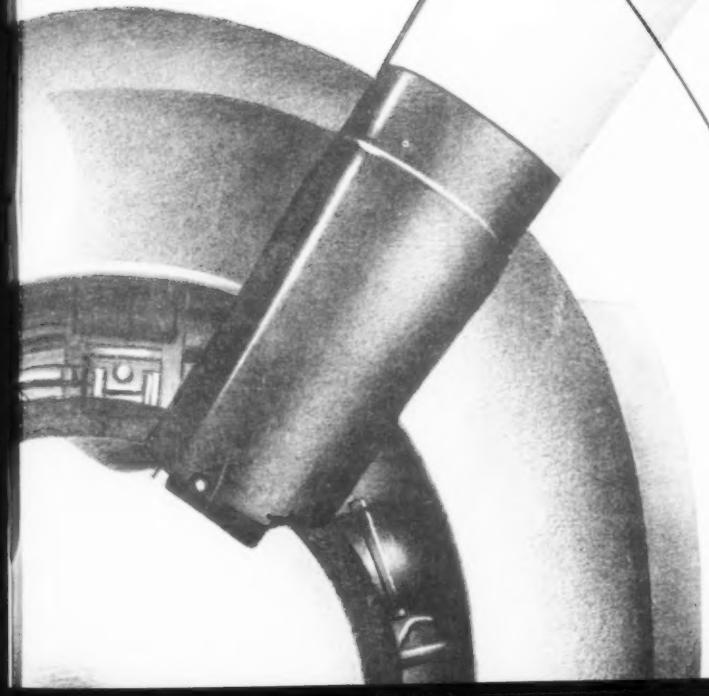

Standardization
CAT Forecasting
Missing Arrestment
Slings and Arrows

October 1962

59

NATOPS

T-34
NAVAL AIR TRAINING AND OPERATING PROCEDURES STANDARDIZATION MANUAL
A4D
T-28
F4D
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A STAN MAN SPEAKS

Standardization, the backbone of the NATOPS program, is a tool, not a club. NATOPS is designed as a means of providing the best and safest aircraft training and operating procedures in an easy to use manual for each type of plane we fly. . . .

When OpNav Instruction 3510.9 first hit the Fleet in May of 1961, most aviators who read it shrugged it off with a remark about "someone's pet program" or "it must have something to do with quality control—only now it is about pilots." At the time, few of us really absorbed what was printed therein and as a result, Fleet knowledge of NATOPS was slow in generating.

Naval Air Training and Operating Procedures Standardization is a real mouthful. However, the key to the whole program is right there in the title. It isn't called a system of "check procedures" or "a spy in the sky." It isn't designed to replace the Aviator's Evaluation Board or the instructions pertaining thereto. It is just plain STANDARDIZATION. It is designed as a *means of providing the best and safest aircraft training and operating procedures in an easy to use manual for each type of plane we fly, to enable such a manual to be attentive to the needs of the operating forces,* and *to provide a training tool for Squadron Commanders' use in determining areas of weakness in his training program or in an individual.*

If you stop to think about it, in some ways Level Readiness has made such a system mandatory. New pilots are now arriving every month—whether deployed or not. If all pilots flying a given airplane are flying it the same way, preflighting it the same way and handling emergencies the same way, this new pilot's training is automatically tailored to the procedures he will find in any squadron to which he is assigned. New procedures to be learned after reporting will be minimized. Old habits can be retained rather than changed.

Once we start really thinking about this program, questions immediately arise. Where does the pilot's handbook (or Flight Manual as it is now titled) fit into the picture? How about the NWP series? What standards are to be met? Good, Sat or Unsat? From 0-100? If the latter, what is passing? What happens if a pilot flunks? How do we get CAG standardized? All these plus a thousand others were immediately voiced. I don't have all answers as yet, and naturally a new program of this magnitude must grow gradually. However, a great many of these questions have now been resolved, and rest assured eventually all of them will. If you read the letter that prefaces each manual, signed by Admiral Pirie, I'm certain you will realize that the program isn't a fly-by-night venture. It is here, and it is up to us to make it work to our benefit.

In outlining the whole program, I might just as

by Captain R. J. Selmer

well clear up one point at this time. The NATOPS manual is complementary to the Flight Manual and little or no overlap is desired or intended. The classified NWP series -41, -41-1, 42-2, . . . will also be part of the whole program. Before any of you wonder just how these all fit together, I'd strongly recommend reading all three first—it should be much easier to understand. As regards the Flight Manual for example, remember this is presently written by the contractor for the Bureau of Naval Weapons, and is primarily technical descriptions. In other words, the contractor is stating that a system works as follows, or if a given set of items are checked and/or actuated a given emergency will not get out of hand, etc. NATOPS manuals should tell you how to operate a system that functions as described in the Flight Manual, or to make a set of systems function to achieve your mission; here are the guidelines on how it is to be done. Flight tactics and techniques, rather than technical descriptions. The mechanics of the airplane are in the Flight Manual, techniques in the NATOPS manual, tactics in the NWP series.

Organization

As diagrammed in OpNav Instruction 3510.9A, the NATOPS program is under the DCNO (Air) - OP-05, and specifically handled by OP-56. The DCNO (Air) has formed an Advisory Group with representatives of all major aviation commands under whose direction NATOPS is administered. The members of this group are: CNAL, CNAP, CG AirFMF-Pac, CG FMF Lant, CMC, CNATra, BuWeps plus the Chairman, CNO's Rep. Under each of these representatives there is a NATOPS organization. Let's take AirPac for example: in each RCVG squadron there is one "Evaluator" for that type of plane, there is one in each of the VP, VS and HS Training Squadrons, and in special category squadrons, such as VAW-11, VF (AW)-3, VFP-63. In all other squadrons there will be a "Standardization Instructor" who will function directly under the Commanding Officer when in his NATOPS capacity, much as the Safety Officer has been doing.

In OpNav there is a "field group" who are responsible for publishing the manuals and changes thereto, the Navy Tactical Doctrine Development and Production Activity. These same people publish the NWP series and may eventually also publish the Flight Manuals, though as I mentioned earlier, BuWeps is presently charged with this responsibility.

The Safety Center monitors the NATOPS program but has no direct responsibility in the organization. Their advice is always available and at times their statistics may very well dictate a modification in existing procedures.

Implementation

Before you can be expected to properly support and use these manuals, some insight into how the manuals were originally prepared is essential. One of the first and foremost objections is "Just who in hell are *they* to tell *me* how to fly the F 53 C? ? ?". Fortunately for us we have a large number of experts for this purpose. Pity poor old Orville—When Wilbur completed FAM 1 for a total flight time of 59 seconds, he was the expert! ! There was nobody, but nobody, that could tell him a thing about flying. Orville just plain wasn't with it.

In our case, Op-56 sent a general outline of sections to be covered in each manual along with general guidelines for content to a number of squadrons or organizations operating such type of airplane. These activities included RCVG squadrons, Marine Squadrons, CNATra, CNAResTra, VR squadrons, etc. These "Experts" wrote the manuals, relying on advice and assistance from their friends in the area.

"It's not how good your equipment is, or how modern your equipment is or how much you have — it is how well you use it" — *RADM E. R. Eastwold, Commander Carrier Division 16.*

The manuals were then sent in the rough to other squadrons operating the same planes for comments, conferences were held in some cases to resolve differences in opinion, and the manuals were finally sent to OpNav for publication. BuWeps didn't get a shot at comments nor did the manufacturers in most cases.

In January of 1962 at NAS New Orleans a conference was held to review the manuals and the whole NATOPS program in general. Over 150 persons attended the meeting including most of the people who wrote the manuals. Changes were submitted, objectives redefined and additional guidelines were provided. The temporary suspension of the Flight Check came about as a result; issuance of a change to OpNav Inst 3510.9A; a new CNAP directive (CNAP Inst 3510.4), etc. Most of the basic objections and questions were resolved. A similar conference was held in August at NAS Minneapolis to insure this program starts off in the right direction with a useful product.

In any event, rest assured these manuals have been thoroughly "staffed." I'll be the first to admit that errors did creep in, but most are being or have been corrected. Let me digress here a bit. I would like to enlist your aid in selling this program. Let's try to eliminate the feeling that a few errors, several misspelled words, . . . mean that the program is no good. I'll admit that if I picked up a copy of "Gone With The Wind" and found 10 misspelled words on the first page, I wouldn't think much of the book. Try to direct attention to the good features of the manuals, let us know your objections, and trust those in charge of the program to gradually smooth it all out. There is a great deal of worthwhile information in these manuals—why not use it?

Once manuals were received, the Evaluators were designated, Standardization Instructors were assigned and the program was underway. Each RCVG Squadron had been told to establish a short course of instruction for Standardization Officers—in most cases this has been done. The SAC Standardization School at Barksdale AFB was attended by several officers. Their program isn't the system we intend to develop, but it never hurts to see how a well organized, well run and thoroughly experienced organization carries out similar tasks. As a result of the New Orleans meeting, Flight Checks will have to wait until grading criteria are established, and check sheets for each model have been prepared, evaluated and issued.

Meanwhile the provisions of these manuals are mandatory and must be implemented at the earliest practicable time. Ground school can be held, open and closed book examinations conducted, and emergency procedures checked in NAMO, OFT or WST as available.

Continuing Program

Eventually the Evaluators will conduct checks on the Squadron Standardization Officer, Commanding Officers, plus several other pilots selected at random. The Evaluator may call on a Standardization Instructor from another squadron to assist. Marine Evaluators may be called to check Navy Evaluators and vice versa. The Atlantic Fleet personnel may be called to check Pacific Fleet personnel. This evaluation is not intended to be a system of spying on each other, but is planning *solely* to assist and insure actual standardization, and of course to provide

liaision on new ideas as a by-product. There is no place in the NATOPS scheme of things for the "I'll scratch your back if you'll scratch mine" type of approach to the program. The machines we fly are too expensive, the numbers too limited and the missions too important.

Another facet of this program that is not fully understood is that the results of the majority of these "checks" are intended for the *prime use of the Commanding Officer of the Squadron concerned.* They in turn can adjust training emphasis for the whole squadron, or for individuals, based on these results. Failure of just one or two items will not necessarily mean the pilot is not qualified. On the other hand, certain failures will automatically result in an overall Unsat grade—such as "What to do with engine failure just after takeoff" or in other critical areas. All this will be spelled out when grading sheets and criteria become available.

After failure, the pilot will have 60 days to achieve a passing grade, and two consecutive failures will normally result in an Evaluation Board. As you can see, this is still all at Squadron level. The Commanding Officer convenes the Evaluation Board in accordance with current directives, and the result might very well be a recommendation by the Board for further training in which case it is still within the purview of the Commanding Officer and it stays at Squadron level. In flagrant cases, the Commandng Officer will no doubt require higher authority to implement the Board's recommendations.

Correction and Review

Since "to err is human" and like General Electric, "Progress is our most important product," a system to correct these manuals and to insure they are kept up-to-date is an integral part of the program. As I said earlier, NATOPS must be attentive to the requirements of the people who are operating the planes.

Basically, changes fall into two categories, Routine and Urgent. To insure that your manuals have the latest changes incorporated, the NavAerNews will have a "box" in each issue listing latest changes, and NavAer Index NW 00-500 will list published manuals together with latest changes on a quarterly basis until such time as the NavSandA Manual 2002, Section 8, Part C takes over this function.

The keynote of this program is to be speed and ease of getting new and/or better ideas into the manuals. To try out new ideas, permission to waive the provisions of any manual may be granted by your next superior in the chain of command if done by message, information to ComNavAirPac, and spelling out a definite period of time for which this deviation is authorized. If ComNavAirPac has any objection, they will let you know, so leave a bit of time for them to comment before starting something.

Future Trends

Naturally it is planned to improve this program as users become more familiar with it, and the initial implementation is more or less complete. Possibly the NATOPS Manual, Flight Manual plus appropriate NWIPS can be combined into a single publication —possibly with classified portions as appendices to make use easier. This would put Flight Manuals under CNO and not BuWeps, which may not sell for a time and may not be desirable. A Carrier Standard Operating Procedures manual has also been proposed to cover approach and departure control procedures, deck handling signals, catapult procedures, . . . A manual for LSO Standardization is now being prepared.

It is planned to start a school for standardization, probably in or near Washington, D. C. to train new people in the business. So far this is still in the talking stage.

The material presented in this article was given as a speech by Captain Selmer at the Third Quarter Safety Council Meeting while he was attached to the Staff of ComFAir Alameda. He was graduated from the Naval Academy in 1942 and served on destroyers during WWII. He has flown transport aircraft (VR-8, VRU-1), patrol planes (VC-6, VC-7), AD, F2H, F9F, F7U and F3D aircraft in VX-5, spent a tour at NATC Patuxent in Flight Test and as Assistant Director of Test Pilot School. He commanded VA-66 (F9F-8B) and later as CAG-2 flew A4D and F8U aircraft.

At present, Captain Selmer is attending the National War College in Washington, D. C.

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Emergency Decision Training

ON a recent tactics flight, a replacement pilot under training experienced several compressor stalls during the nose high position of a "Yo-Yo" maneuver while using combat power. The pilot immediately reduced the throttle to IDLE and at the same time *felt* as though the aircraft was aerodynamically stalled.

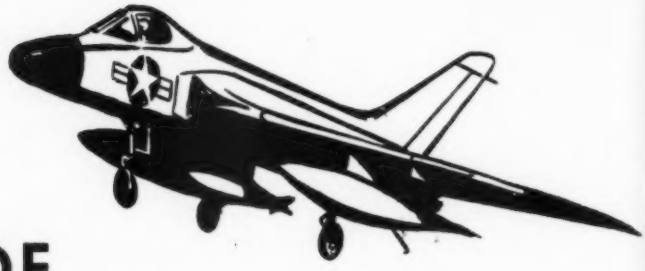
This uncontrolled flight produced sensations that *felt* like the flight control systems were inoperative because of the heavy stick forces and the emergency power package was extended to regain flight control power. The pilot then *felt* that the aircraft was spinning. The spin recovery was normal. At this time the pilot *thought* the engine was flamed out, and he placed the throttle OFF. The stab switches were recycled to ON and as main electrical power was lost, emergency generator switch to LAND was selected. After three or four unsuccessful air start attempts were made, the pilot ejected.

The emergency generator and its control switch were recovered from the wreckage. It was established that the generator was rotating and capable of producing electrical power and that the emergency generator switch was OFF at impact. The pilot had failed to turn the switch ON which is necessary for the airstart.

The pilot had completed one-third of the syllabus (FAM portion), six OFT flights and all support lectures required at this point in his training. He had attended a briefing concerning compressor stalls on the day previous to the accident. The pilot had about 2500 total flight hours with over 2000 single engine jet hours.

The accuracy of measuring pilots ability or predicting his performance based solely on the number of hours a pilot has attained appears to be increasingly less feasible. With more complex problems facing the pilot, an increasing emphasis must be placed on the fullest use of the OFT/WST. These flights should occasionally be monitored by the squadron Commanding Officer or Operations Officer.

During emergency stress situations, the pilot, and crew if applicable, must take the necessary time to methodically complete the corrective action for the emergency involved. If the emergency is compound, it is even more important to make certain that the proper control is in *fact* actuated and that a certain desired response is gained by this action. Random actions seldom accomplish a definite task. ●



THE CASE OF THE MISSING ARRESTMENT

As people who launch from boats well know, there are times when it just doesn't pay to check the flight schedule. A junior LCDR launching from one of the CVA-19 class, must have experienced that feeling when he finally got back aboard the hard way.

"I was assigned a single night CAP scheduled from 2000 to 2130 hours," he said. "I had sufficient rest the night before, and had flown one hop in the late morning.

"The first F4D that I preflighted had no instrument lights. After securing this aircraft, I preflighted another one which was O.K. and I taxied up to the cat, launching at 2038 hours. There was no horizon or moon and it was overcast. The hop was normal in all respects except that on returning to the ship the CCA was done via CIC frequency.

"The CCA resulted in a waveoff due to being high. I then made six successive bolters . . ."

How could this happen to a 2000-hour pilot with a couple of deployments under his belt? He had been flying the F4D for almost a year and a half and was no stranger to the aircraft. The sea state was moderate and there was no pitch or roll to deck.

His performance was surprising in view of a past fleet exercise where he made at least two night recoveries in extremely adverse flying conditions—one in low ceiling and visibility and one in rain. As a result, he had earned the respect of others as a true all weather aviator.

During the series of bolters the squadron skipper was in primary flight control. "Prior to the fifth bolter," he said, "pilot reported a state of 1000 pounds. Considering a minimum of 200 pounds of fuel for each bolter and approach, I calculated that he would have 800 prior to a sixth pass and 600 pounds prior to a seventh approach."

The fifth pass started with the aircraft on speed and altitude but becoming low in the groove. Correcting for the low, the pilot flattened his glide path and bolted again. By now the old catwalk quips about "man air defense and shoot him down" and "offer him money" were beginning to lose their humor.

"Following the fifth bolter," continued the squadron C. O., "I recommended that the pilot be given one more normal approach and, if he did not get aboard, that the barricade be rigged."

The next pass was like the previous ones and resulted in a bolter. The barricade was ordered rigged.

"At about the 90-degree position" the pilot said, 'I blew the tanks off. Lights on deck were very bright which made lineup difficult. On requesting less light, I was informed that the barricide was still

being rigged."

As the aircraft neared a final groove position the deck light intensity was decreased; the barricade was ready and the flight deck people had scrambled to their holes. Rigging time was three minutes.

The controlling LSO remembered this final pass as a good start with a nice descent. "Approaching the ramp," he said, "the pilot decelerated and dropped below ramp level. A call was made to bring it up. Power was added and the aircraft cleared the ramp by a very few feet. It continued up the deck airborne and accelerating as the barrier was reached."

This final approach would also have resulted in a bolter as no crossdeck pendants were engaged but the barricade arrestment was successful. After shutting down, the pilot's relief was no doubt immediately subdued by the fact that he hadn't been able to catch a wire and was forced to use that "other" way to stop. The ship had a ready deck in less than 10 minutes and shortly thereafter another squadron pilot, with similar night carrier qualifications, made a routine recovery.

This may have added to our pilot's discomfort when he had to make a statement for the accident report. Yes, the inflight barricade engagement had banged up his *Ford* for a total substantial damage.

What had gone wrong?

"His main problem," said the LSO, "was starting too high as he commenced his approaches and when starting correctly, allowing the ball to go low in the groove, forcing a power call in which he accelerated, flattened his glide path and prevented an arrestment."

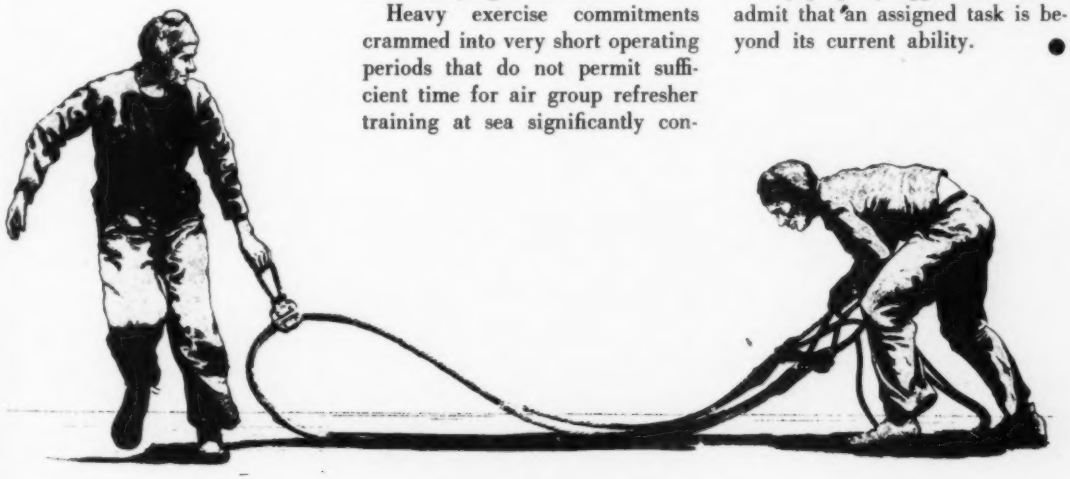
They put this fellow up with several strikes against him. He had not been afforded the opportunity to maintain night carrier landing proficiency. This was the pilot's first night carrier flight in two months and only his second in a four-month period.

"This is considered entirely inadequate," commented a senior naval aviator, "for even the most experienced pilot to maintain all-weather night qualification." In addition, this pilot had a total of 12 night carrier landings, two of which were made under extremely adverse flying conditions.

Heavy exercise commitments crammed into very short operating periods that do not permit sufficient time for air group refresher training at sea significantly contributes to this type accident. No amount of night FCLP prior to deployment can adequately substitute for a reasonable opportunity to conduct general air group training and refresher operations afloat.

Optimism sometimes outweighs objectivity when the challenge of fleet exercises tests unit pride and morale. Supervisors at all levels have gambled and lost when dark nights and no horizon during a fleet exercise have overtaxed a unit's or pilot's degree of readiness. Operational commands must be fully advised whenever exercise commitments cannot be met without exceeding prudent limits of safety.

Those in the chain of command, from the unit level up, who monitor training must be alert to recognize, and advise against, overcommitment. The squadron commander, in the final analysis, must say whether his pilots are *safe* to perform the mission. The operational commander's decision, not infrequently a difficult one, must be based on complete input from those whose responsibility it is to keep him informed. It must not be overlooked, and it must include allowance for reluctance on the part of any properly aggressive unit to admit that an assigned task is beyond its current ability. ●



YOUR Occupation and Your Mental ATTITUDE

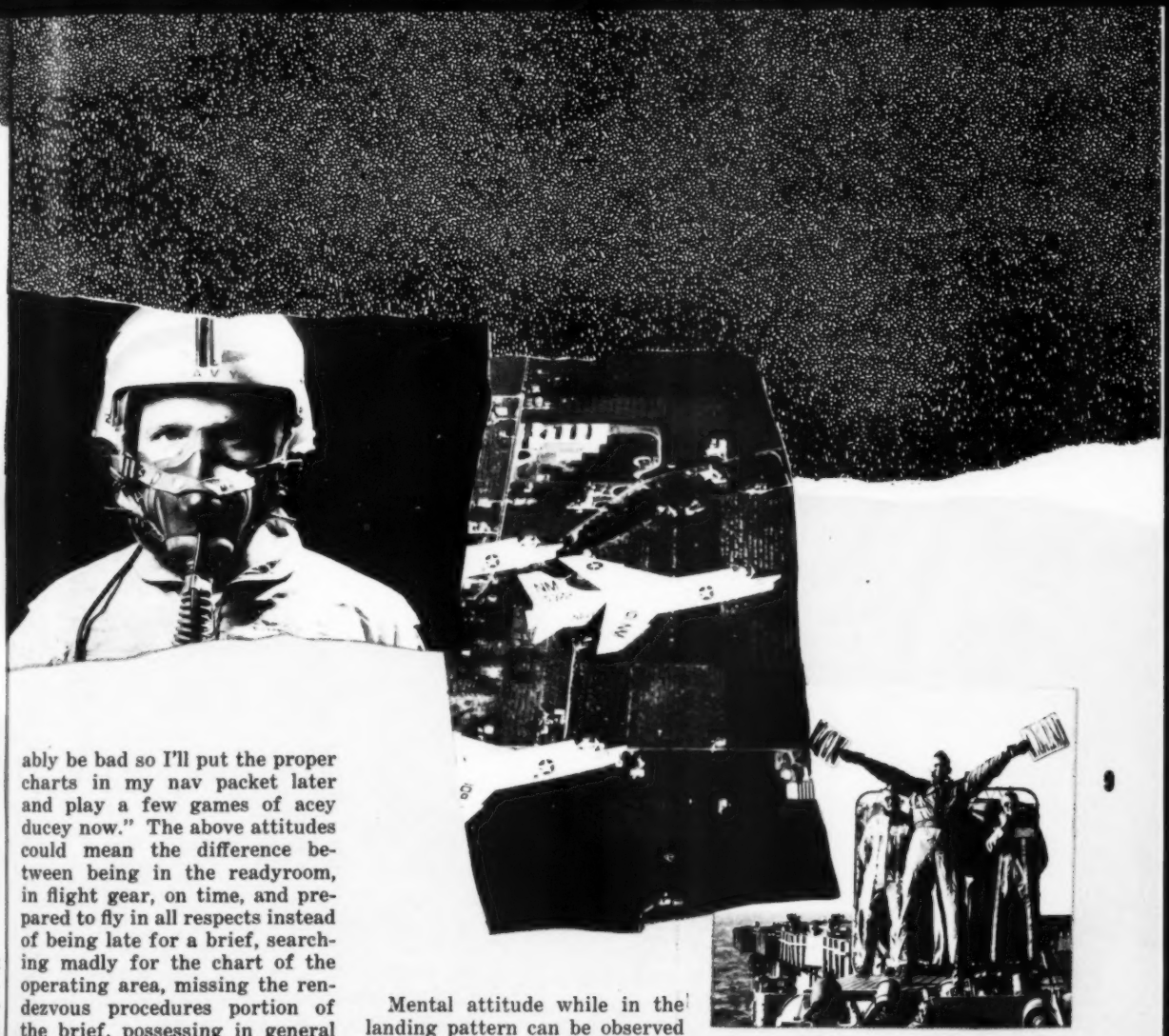
By LT F. K. Ellis

FOR some of us the word "occupation" means "profession," for others it means "obligated military service," for still others it means "suitable employment until a better job comes along." No matter what the word means to *you*, your mental attitude toward your occupation will have profound results upon how effectively you perform your assigned tasks.

What is meant by mental attitude? This refers to those impulses of the brain that say, "I sure hope it's too foggy to fly today," or "I'd like to be getting some actual instrument practice up in that weather!" or "Why bother to reprimand Jones for failing to display proper military courtesy? No one else seems to care," or "I'll take care of this disciplinary matter now"; and so on throughout the day.

This mental attitude becomes apparent in everything we think or act upon; but, let's just consider it in relationship to our flying. We'll further categorize by looking at our mental attitude prior to flight, during flight, and after flight.

Prior to flight we can look ahead and decide, "Well, I guess I'd better forego the movie tonight or that card game with Bob so I can get to bed at a decent hour and get up for breakfast in the morning. I feel more like flying after a good rest and with some food in my stomach." On the other hand prior to a flight we can feel, "It's been *so* long since that last hop I flew that I honestly don't care whether I fly tomorrow or not. Anyway, the weather will prob-



ably be bad so I'll put the proper charts in my nav packet later and play a few games of acey ducey now." The above attitudes could mean the difference between being in the readyroom, in flight gear, on time, and prepared to fly in all respects instead of being late for a brief, searching madly for the chart of the operating area, missing the rendezvous procedures portion of the brief, possessing in general an "I could care less—It's just one more boring training hop" attitude and possible not returning from that "boring training hop."

In flight these same impulses can say, "Here we go again, another plane with unreliable —. I guess I'll notify the tower that I'm aborting the Hop." Or the impulse could say, "Oh brother, I can't expect much from this —. I'm really going to have to try using some of those procedures that the Operations Officer put out in that APM. Let's see, what *did* he say?"

Mental attitude while in the landing pattern can be observed by many. As a wingman are your thoughts, "What a lousy lead! You'd think with all those hours he'd be able to fly the airplane better," or are they, "Wow! This is really good practice for me. I didn't realize I couldn't hack the formation any better than this." What about the "meatball" on your Mirror Approach? Does the little voice say, "Orange Ball, you're going to stay centered all the way down," or does it say, "Well, here goes nothing. I sure hope I don't blow a tire and get fined 50 cents."

Finally, after flight this same old mental attitude prevails. As the LSO debriefs you some night think, "You're so wrong, pal. I *know* I wasn't slow. After all, I was flying the airplane." With this attitude another debriefing may never be necessary. Let's hope your mental message says, "You, Mr. LSO, are so right. My next pass *will* be better."

So your mental attitude contributes to your performance. So what? So you are the controller of your mental attitude, and therefore, your performance. ●

FORECASTS

A new service for military aviation was initiated on November 1, 1961 by Air Weather Service to meet the growing requirement for forecasts of areas where clear air turbulence (CAT) could be expected. This was the first forecast issued by the newly organized Clear Air Turbulence Forecast Section at Detachment 4, 4th Weather Group, Kansas City, Missouri.

Years ago, it was generally believed that weather hazards to flight would be minimized once planes were developed which were capable of flying over the tops of storm areas. With the advent of faster, higher flying planes, however, reports of encounters with a mysterious clear air-turbulence, or CAT upset these previously conceived ideas. Most of these encounters were merely irritating or disturbing. Occasionally, however, a CAT would be severe enough to require hospitalization of crew or passengers, disrupt refueling operations, or even cause structural damage. The crash of a civilian airliner in Indiana, the disappearance of another over Lake Michigan, and the loss of a jet bomber, all attributed to CAT, brought home the seriousness of the problem.

In May 1961, a study group met to determine the feasibility of setting up a CAT forecasting section to meet the problem. Based upon recommendations of this group, Air Weather Service in August 1961 directed the establishment of a CAT forecasting station at Detachment 4 to develop techniques and to prepare forecasts for "All turbulence above 16,000 feet over North America, not associated with convective activity."

A forecasting program based upon a combination of the horizontal wind shear criteria used by United Airlines, and the vertical wind shear criteria used by Eastern Airlines was set up.

Procedures for forecasting mountain wave occurrences were worked up. These were based primarily on the papers by Kuettner and Jenkins of the Geophysics Research Directorate, with intensity determined from a modified monogram developed by United Airlines for the Denver area. Indoctrination of the new forecasters and preparation of practice forecasts were started in early October.

At 8 a.m. Greenwich time, 1 November, the first of a new series of CAT forecasts was sent over the teletype circuits.

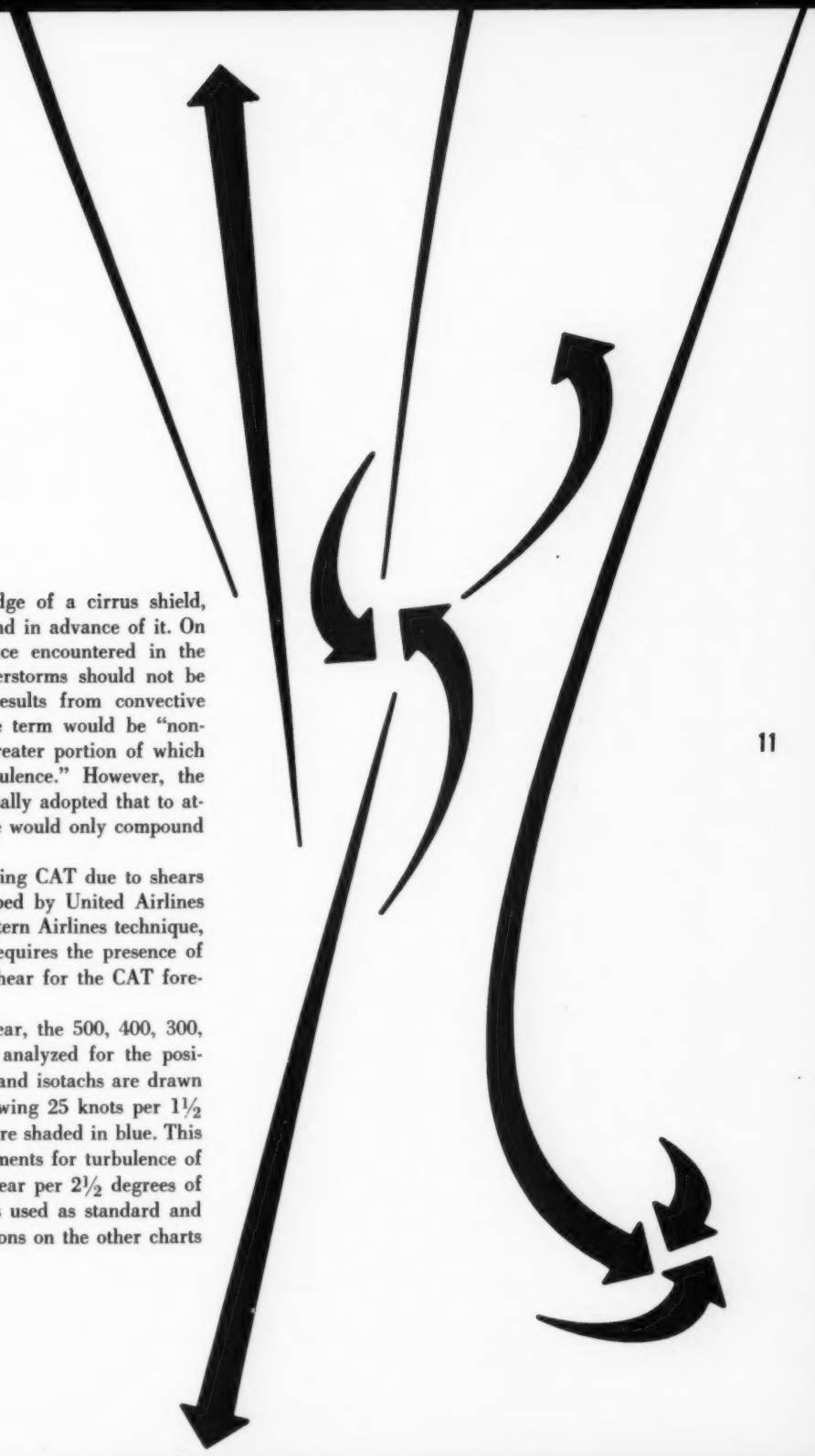
One daily CAT forecast covering the Continental U. S. was issued in November and December. This was increased to two daily on January 1, 1962.

Actually, the term "Clear Air Turbulence" is a misnomer. It includes all types of turbulence not associated with convective activity, in clouds or out. For example, one area where CAT is frequently encoun-

tered is along the leading edge of a cirrus shield, both within the cloud layer and in advance of it. On the other hand, the turbulence encountered in the clear air between two thunderstorms should not be reported as CAT, since it results from convective activity. A better all-inclusive term would be "non-convective turbulence," the greater portion of which is the result of "shear turbulence." However, the term CAT has been so universally adopted that to attempt to change it at this date would only compound the confusion.

Procedures used in forecasting CAT due to shears are based on methods developed by United Airlines and Eastern Airlines. The Eastern Airlines technique, the one basically employed, requires the presence of both horizontal and vertical shear for the CAT forecast.

To determine horizontal shear, the 500, 400, 300, 250, and 200 MB charts are analyzed for the positions of wind maxima (jets), and isotachs are drawn for every 25 knots. Areas showing 25 knots per $1\frac{1}{2}$ degrees of latitude or greater are shaded in blue. This agrees with minimum requirements for turbulence of at least 40 knots horizontal shear per $2\frac{1}{2}$ degrees of latitude. The 300 MB chart is used as standard and analyzed completely. Jet positions on the other charts



are carefully correlated with the analyzed 300 MB wind positions. In addition, a prognosis of the 300 MB wind field is made to aid in forecasting the future locations of presently analyzed CAT areas.

In order to determine vertical shear, wind profiles are plotted and analyzed for all RAOBS and PIBALS which extend to 16,000 feet or higher, and which reach a velocity of at least 60 knots. The heights of the primary wind maximum and of any secondary maxima are noted. For those levels where vertical shear equals or exceeds 6 knots per thousand feet, the base, top and maximum shear (keeping positive and negative shear areas separate) are tabulated against the appropriate wind maximum. A height-of-maxwind (HMW) chart is analyzed to insure that shear layers at adjacent stations are correctly correlated, since the core of a wind max may change considerably in height across the U.S. Positive and negative shear charts are then plotted and analyzed to determine areas and magnitudes of vertical shear.

In those areas where the vertical shear is equal to or greater than 9 knots per thousand feet, and where horizontal shear at the same levels is sufficient, moderate turbulence is assumed to exist. With a vertical shear of 15 knots/1000 feet or greater, severe turbulance is assumed. These areas are then checked for possible modification against the activity charts, where all PIREPs above 15,000 feet are logged. An analyzed CAT area chart is then drawn. Using a prognostic 300 MB chart, these CAT areas are then progged for the next 16 hours, and the areas swept out during each of the two 8-hour periods by each analyzed area outlined as the forecast CAT areas. Minor modification of the bases and tops is made as required by the synoptic situation. An extension of this process to provide a 24-hour further outlook completes the forecasting procedure.

In addition to mountain wave and shear turbulence, three other conditions have been noted with which the CAT is frequently associated.

1. A sharp trough aloft, especially when it is moving across the country at 20 knots or greater. Winds on opposite sides of the trough may be 90 degrees or more opposed to each other. Even with wind speeds of only 30 to 50 knots, and with no appreciable vertical shear, moderate or severe CAT will frequently be reported along the trough line.

2. Associated with an advancing cirrus shield CAT may be encountered both ahead of and within the cirrus clouds. It appears that the progressive movement of the cirrus shield is not only the result of advection, but also indicative of vertical motion of the air, carrying moisture upwards until sublimation occurs, and thus extending the cirrus further. Under these circumstances, CAT is especially prevalent when the advancing cirrus shield is close to the tropopause level.

3. Associated with strong diffluence or divergence aloft, divergence at one level must be compensated for by another, with an induced vertical movement of air between them. When the convergence occurs near the surface of the earth, and is associated with convective activity, severe thunderstorms can be expected. However, convergence may occur at higher levels, with insufficient moisture to produce condensation. It appears that many of the encounters with CAT which cannot be explained by mountain wave, shear, troughs, or associated cirrus, are the result of this dynamic action.

A very important factor in CAT forecasting is the receipt of numerous and accurate PIREPs. It is just as important to know where CAT has not been encountered as to know where it has been. Unfortunately, the PIREP program cannot as yet be considered completely satisfactory. Lack of pilot reports cannot be overcome by more intensive analysis or rawin data. From the number of PIREPs received, it would appear that there are times, especially on weekends, when the skies over the US must be entirely devoid of any aircraft. When CAT is encountered, specific details as to intensity, altitude, location and time should be included. Considerable improvement has been noted in PIREPs.

CAT forecast section is co-located with the Weather Bureau, SELS, District Forecasting, Airways Forecasting, Pilot-to-Forecaster, and Radar Analysis and Development units. The Terminal Forecast Facility and the CAT Forecast Section derive many benefits from mutual exchange of information and ideas, and from the extensive communications network servicing all these units.—*from "The Air Weather Service Observer"* ●

The sky is a vast place—but there is still no room for error.—*FSF*

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FLIGHT NOTES

Exchange of Information

The steady reduction in aircraft accidents in the past few months is attributed to a combination of many things and one of the more important is the timely dissemination of aircraft accident information and recommendations for corrective action.

There has been no reduction, however, in incident reports. Incidents are all accidents of minor or limited damage and constitute a major accident potential. By their volume alone, they reveal more clues to potential accidents than do the accidents themselves. Inter-squadron exchange of incident reports by model aircraft would accomplish the timely dissemination of vital safety information. This should be done in memorandum form with a brief of the occurrence and the corrective action taken. Trends or patterns might then be discovered at the squadron level in time to prevent a major accident somewhere else.—*ComNavAirPac*

Altimeter Setting Error

THE flight was cleared to descend to 11,000 feet and the pilot was given an altimeter setting of 30.79. The aircraft had been cruising at 13,500 feet maintaining VFR on top of a cloud deck. Although the altimeter setting was a radical change from the previous setting, neither pilot questioned it. Luckily, it was daylight and the clouds ahead were thinning out. Upon reaching the newly assigned altitude the pilots noted that the aircraft seemed extremely low in respect to the terrain ahead.

A quick recheck with a ground station revealed the altimeter setting to be 29.79 vice 30.79. After resetting the altimeter, the correct altitude was discovered to be about 10,000 feet—1000 feet difference! An immediate climb was made to 11,000 feet and the flight proceeded safely to destination.

Each .1 inch of altimeter setting is equal to approximately 100 feet. Be quick to question a large pressure change over a short distance unless the change is accompanied by corresponding weather phenomena. If the aircraft proceeds from a low pressure area to a relatively high pressure area without changing the altimeter setting, will the true altitude be higher or lower?—*NASC "Crossfeed"*

Flight Lookout

THERE was a time when the sky was considered so vast as to preclude all possibility of collision between aircraft. Like the many uses of a single nickel, however, that day has long since passed. Today, the passwork in the cockpit is vigilance, eyes, that scan the skies below and above and from side to side, with an intent akin to perusal of a scantily-clad chorus line or at least the pan in panning for gold.

But what happens when an engine begins to falter, when an oil pressure gauge, a jet JPT indicator or some other instrument indicates cause for concern? All too often all eyes turn immediately toward the malfunctioning engine, for example, leaving no one specifically assigned to "mind the store" either in flying the aircraft or keeping a watch outside (except in the direction of the bad engine and then only at the engine itself!) Competition for vigilance may even come from another airplane that seems to be on a collision course. All eyes turn to it. Some other airplane may also be endangering yours and not be seen because of lack of vigilance.

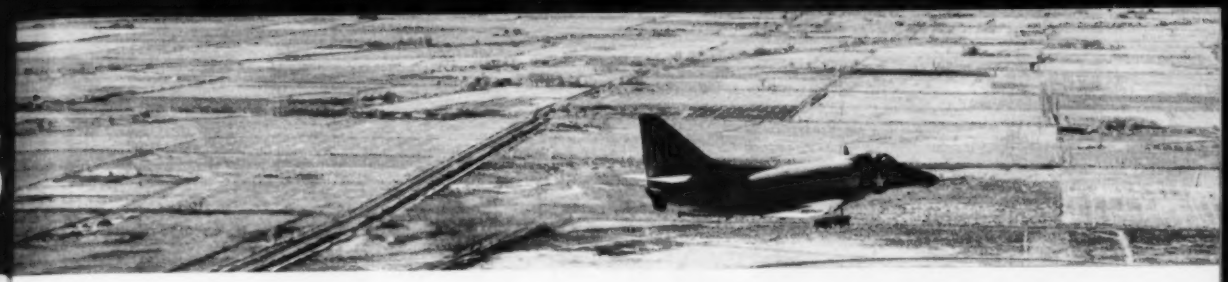
For safety sake, effect a plan of action that assures constant and continuous vigilance everywhere outside the cockpit, and similarly assures someone is flying the airplane. Practice this plan of action in the simulator. Let it become automatic and thus be certain all the bases are covered—outside and in—in time of emergency.—*Flight Safety Foundation, Inc.*

Take A Bolter?

The pilot concerned is the most experienced carrier and heavy attack aviator in the squadron. As an ex LSO he is well aware of the hazards associated with late corrections. Under normal deck conditions he is capable of safely sweetening his approach at the last instant. Had the deck not been rising, I am certain that the incident would not have occurred. That even an "old pro" could not safely execute a late high ball correction lends credence to our plea to "take your bolter like a man."

Use of VOR Receiver During Primary Airborne Receiver Failure

THE capability exists wherein airborne VOR receivers (AN/ARN-14) may be tuned to any frequency between 108 and 135.9 mcs thereby providing the pilot with an alternate VHF receiver which could be utilized for receipt of communica-



tions in the event airborne primary VHF/UHF receiver equipment becomes inoperative.

For this reason, it is requested that each operating unit accomplish the following:

a. Brief all *control* personnel on this alternate capability.

b. Ensure that transmissions made in the blind to UHF equipped aircraft experiencing lost communications are also made on the emergency frequency of 121.5 mcs.

c. Cover this additional capability at meetings as a method of pilot education.—*MATS Letter*

Minimum Jet Fuel Dumping Altitude

A very interesting and informative article, concerning minimum altitude for dumping of jet fuel, appeared in a recent issue of Delta Air Lines "Up Front" publication. Following is a condensation of that article:

Recently a passenger aboard an 880 became violently ill, just after takeoff, it was necessary to dump fuel and return to Atlanta. The weather conditions were CAVU in this particular case, but assume there was an overcast at 4000 feet. The Captain must now decide whether he should accept an IFR climb to a higher altitude to dump fuel, or if he should dump fuel below the overcast which would mean about 3000 feet above the terrain. A recommended minimum fuel dumping altitude would have helped the captain in making this decision.

There are three factors of varying importance upon which a minimum dumping altitude must be based:

- Development of a flammable mist near the ground.
- Toxicity to human beings and animals
- Harm to vegetation and soil.

To answer these questions Delta researched several NASA Technical Notes, the Standard Oil Company and a government bureau in Washington, D. C. The answers were (briefly) as follows: Development of a flammable mist near the ground is a remote factor, provided fuel is dumped above 1000 feet. No toxic effect will be produced in human beings or animals when fuel is dumped above 1000 feet. No specific dumping altitude minimum is given with regard to vegetation damage; however, an altitude considerably over 1000 feet appears necessary to assure complete vaporization of the liquid fuel.

In view of the factors involved, a minimum of 6000 feet above the terrain is recommended for dumping jet fuel in other than emergency situations, weather conditions permitting.

Fuel Dumping—All Airplanes

FAA recently defined the Vapor Zone, behind aircraft dumping fuel, as the airspace at least 1000 feet above, 2000 feet below, five nautical miles horizontally behind and one-half nautical mile on either side of aircraft jettisoning fuel. It is the responsibility of ATC, during IFR conditions, to provide adequate separation between aircraft dumping fuel and other aircraft; therefore, they should be notified before and after the fuel dumping operation.

The Operating Manuals are being revised to caution against flying a circular pattern while dumping (which might return the aircraft to the Vapor Zone) and to define the Vapor Zone. Also, notifying ATC is being added to the dumping procedures.—*TWA Flight Deck*

Emergency Philosophy

"WHILE it is highly desirable that pre-planned courses of action be utilized by pilots in emergency situations, these actions, if at variance with published handbook and other SOP information, should be thoroughly investigated prior to adoption. If such a procedure effecting survival is deemed worthy of adoption, it should also be recommended, through the proper channels, as a change to those published procedures with which it is not compatible."

—*FROM AN AAR*

Out of Practice

According to the check pilot of one airline, those pilots previously qualified to fly the jets, but who go back into piston aircraft for a period of three months or more, consistently manifest the following tendencies in their initial landings back on the jets:

1. Over-control laterally
2. Level off too high above runway
3. Hold off.—*FSF Bulletin* ●

Cold Turkey

I WAS wingman of an A4D section participating in a long cross-country. Weather was such that we climbed to Flight Level 350 to avoid thunderstorms. Following our second position report a thick cloud layer appeared ahead of us and my traumatic experience was about to begin.

The leader turned his light bright and steady and I increased defrost and set the air conditioning knob to WARM preparatory to entry (my pitot heat had been ON prior to takeoff). We were soon in the soup with an estimated visibility of 15 feet. I could barely see Lead's canopy.

The third position report was made at Louisville. Soon after passing there my canopy began frosting up. I increased my defrost and turned up the heat on the air conditioning. About 10 minutes later, still in the soup, Indianapolis center told us there was a thunderstorm 12 miles ahead. We requested a vector around same and banked to the right.

By this time my Tacan azimuth and DME were spinning and the canopy was three-quarter frosted; I had to keep wiping it clear to

ANYMOUSE

see the Lead. Now he began pulling away, and me with 100 percent. I called him for 90 percent. He "rogered" but I could barely keep him in sight and I called again for 90 percent. This time he said he was coming back to 80 percent. The next thing I knew I was closing very rapidly, too rapidly. I pulled my power back to IDLE. I was passing him. I tried speedbrakes; no speedbrakes. I passed him. I tried calling him; no radio.

Pulling to the left to avoid his flight path, my gyro showed a constant 40-degree right bank. Complete electrical failure! As I pulled the emergency generator I slammed into the thunderstorm. The standby gyro was wobbling back and forth from 80-degrees left to 80-degrees right and even though it showed 20 degrees nose-down, stall buffet was felt. I gave it up as a lost cause and went to needle and ball but this instrument was also swapping sides.

Rate-of-climb was pegged at 6000 feet down. With some back pressure on the stick, pegged at 6000 feet up buffet was felt again. The attitude gyro was still out and this time I tried the old nose-high unusual attitude, partial panel recovery learned in the training command. While adding power I realized I had been at IDLE. Lo and behold, the bird leveled off at about 20,000 feet.

I decided to descend to 13,000 feet and turned the UHF to guard, IFF to emergency. A Mayday report was given in the blind though I didn't think I was getting on the air. The attitude gyro started to act normal so at 13,500 I leveled off. I tried radio again, had side tone this time, and issued another Mayday.

Of course every station in the U. S. answered me. I chose the loudest which was Louisville radio at Standiford Field. Even though I was in the portion of the storm which contained hail, the Standiford controller did a fabulous job of directing me with UHF/DF. He said he was vectoring me to Standiford and gave me the dope on the field. I broke out of the storm, descended, and made an uneventful landing. Meanwhile the word had been passed to the leader who continued on. Later he told me he had fuel control problems and his engine auto-decelerated to IDLE, thus the reason why I passed him. He had to continue in manual fuel control.

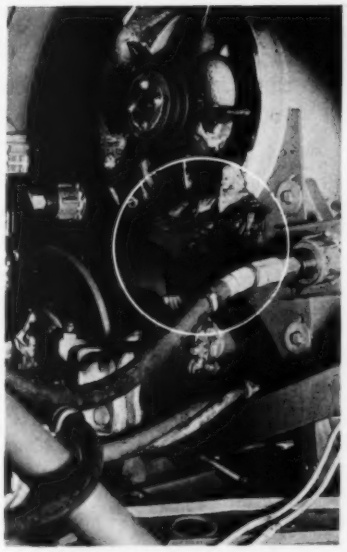
After being chocked I tried my generator by-pass switch and found the main generator functioning. Therefore, I could only conclude I had generator freeze-up. This particular aircraft did not have the service change which provided for a baffle drain to prevent such a circumstance (the parts were on order).

Generator freeze-up can possibly be predicted by slowly losing the defrost and air conditioning system, then the Tacan and attitude gyro. I found that even without the fuel boost pump, which is lost while using the emergency generator, I had no flameout difficulties even though I was in heavy turbulence, hail and rain. It took an estimated four or five minutes for the attitude gyro to come back on the line after the emergency generator was pulled.

Wayward Rag

ONCE upon a time there was a rag left behind on the transmission deck of a HSS-1. Along came a pilot to preflight the plane and he missed seeing this Rag—it was an early morning launch.

After becoming airborne, there was a funny smell in the aircraft



and smoke was observed to be pouring out of the transmission section. The pilot made one turn around the pattern and landed. The little old rag had stopped the oil cooler fan and the belts had burned and ground themselves to shreds.

Thought you might use this picture and story for a little prevention—it happened and can happen again.

• *Thank you Anymouse, wherever you are.*

Thanks, W.W.

COPILOT in left seat of S2F shot five touch-and-go landings. Pilot in right seat then shot two landings. On the third landing, pilot observed red flares off port wing and took waveoff. The wheel watch, bless his heart, saw the gear was not down when we were on long final but had to run to his truck to get the flare gun.

Why: The copilot had gone over the checklist but the fact that the gear handle was not down just didn't register and the pilot had neglected to check. ●

HEADMOUSE

Slings and Arrows

Dear Headmouse:

It seems as though you folks must be smarting from the slings and arrows cast at you of late re: Letters to the Editor, July APPROACH. Now let me throw mine.

1. In the June issue you quoted MIL-C-18263C(Wep) para 5.5.3.1 faithfully in regards to prop tip painting but you failed to note para 1. 1(a) of that instruction which states that these specs are not applicable to color requirements for insignia and markings as those requirements are in MIL-I-18464C-(Wep). The latter mentioned specs prescribed yellow markings four inches in from the tip of the blades. It appears that the red and white color combination is not correct.

2. Why is the horse collar sling still in use? I cringed when CDR Shepard got picked up with that old sling and just can't help wondering why the three-pronged seat is not used.

3. Is there any instruction or criteria which can be used in determining the amount of runway which should be used for takeoff? The pilots handbook will state the normal runway required for takeoff roll but if the takeoff roll is computed to be 4000 feet and the runway is 12,000 feet long should the pilot taxi to the end of the runway before starting takeoff? At our base the runways are 13,500 feet long and runway 32L has a parallel taxiway that ends 6000 feet from the end of the runway. If 32L is the only available runway and the A4D with a 4-5000 foot takeoff roll is going, how much runway should be allowed for takeoff?

ANYMOUSE

▶ With bouquets must come some brickbats. Reminds us of the sign seen on the edge of a midwestern town saying "Welcome to Ravenna —the home of 10,000 happy citizens and 100 disgruntled ones." Like Ravenna we welcome correspondence from readers in any case.

Re Item 1: We're on solid ground on this one—Props are painted as per Mil-C-18263C of 1959. Mil-C-18464 of 1952 is be-

Attention TF Drivers

A few cases have been reported of inflight loss of all pressure instruments due to suspected moisture condensation in the static vent line.

In aircraft with no alternate air system, such as the TF, the emergency method as set forth in the All Weather Flight Manual (page 3-2, Operation of the Pitot Static System) is as follows: If the pitot static system fails, first dump cabin pressure; then break the glass in either the airspeed indicator or the altimeter with a sharp instrument which will fracture the glass without damaging the instrument or bending the needle. The instruments will then read with approximate accuracy.

If you must use a blunt object (such as your heel) to break the glass, smash the glass in the vertical-speed indicator because it is the least essential to safe flight. With this procedure, however, the instrument readings will not be correct. If the vertical-speed glass is broken, *it will read in reverse,* and the other pitot-static instruments will have a pronounced lag in their readings.—*Alameda Newsletter*

There is another and better way to accomplish this same thing in the TF which VR-24 did in Naples.

There was a static pressure line located at about the height of the copilot's knees on the right side of the cockpit. That line was opened and capped. (Authorized to modify one plane by BuWeps Inst.) Then when and if the instruments froze the line was uncapped. The instruments read the cockpit pressurization which gave correct readings within 50-100 feet and 2 to 3 knots in A/S.

Very resp'y,

Headmouse

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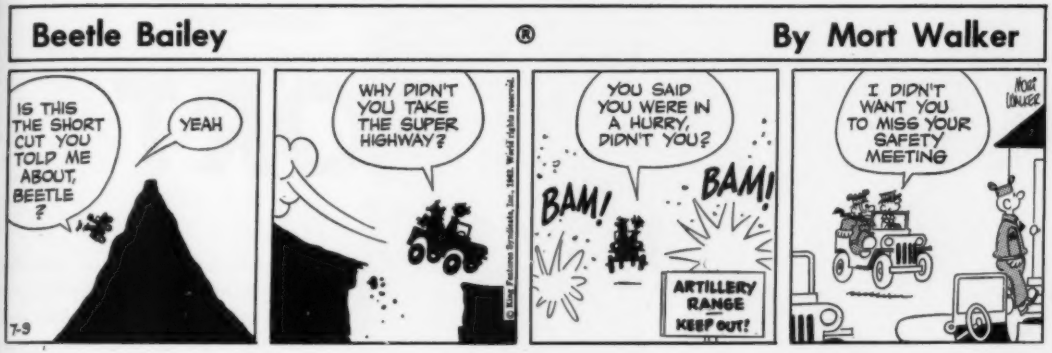

Beetle Bailey ® By Mort Walker
IS THIS THE SHORT CUT YOU TOLD ME ABOUT, BEETLE ?
YEAH
7-9
WHY DIDN'T YOU TAKE THE SUPER HIGHWAY?
YOU SAID YOU WERE IN A HURRY, DIDN'T YOU?
BAM!
BAM!
ARTILLERY RANGE KEEP OUT!
I DIDN'T WANT YOU TO MISS YOUR SAFETY MEETING
MORT WALKER

ing revised and updated. Propeller painting portion of that document is obsolete and will be deleted according to BuWeps (Code RRMA-53).

Item 2—That old sling still has advantages over the seat. Namely:

a. Light weight and resiliency —less chance of injuring the rescuee.

b. Less chance of becoming fouled with surface craft on pick-up or letdown.

c. On letdown the rescuee can cushion ground contact with his feet. There's the possibility of injury to the spine when contact is made in the seated position.

d. Less stowage problems in ASW configured helicopters.

Because of the special circumstances in the astronaut pick-up it was determined by competent authority that the sling would be preferable to the seat. Rest assured that the decision was made with deliberate consideration of all involved factors.

Item 3: There's nothing more useless than the runway behind you in case of engine failure or other cause to abort.

Very resp'y

Headmouse

Hot Dope on Cold Weather

Dear Headmouse:

I am a Flight Surgeon deployed with a squadron of P2V aircraft here in Kodiak and Adak, Alaska.

I would greatly appreciate all the information you could send me regarding cold weather and Arctic survival. I plan to give numerous lectures to the squadron on this subject.

LT, MC

► In answer to your request for information on cold weather and Arctic survival, we are sending you two Sense Phamphlets, "Aleutian Sense" and "Arctic Sense"; a selection of cold weather survival posters; copies of two articles, "Frostbite" and "Cold Injury," which appeared in the January APPROACH; and a copy of Chapter 21, Survival in the Arctic, from NavAer 00-80T-56. You will note that at the end of this chapter there is a list of references on this subject. One of the most valuable of these publications is NavMed 1307, Fundamentals of Arctic and Cold Weather Medicine and Dentistry by CDR H. B. Eisberg, MC.

We are also sending you a copy of the current listing of publications, directives and movies pertaining to aviator's equipment and survival training. Some of the films, particularly "Survival in the Aleutians" (MN 7818) and "Survival in the Arctic Tundra" (MA 6948) should be of particular interest to your squadron. "First Aid for Aircrews" should be available through your film library and is highly recommended.

The Polar Guide (NavAer 00-80T-32) is an excellent reference book and should provide considerable guidance for survival lectures. The BuMed Newsletter has published a number of articles on cold weather survival and related problems. Among these are "Local Cold Injury," Vol. 26, No. 11; "Immersion Foot," Vol. 27, No. 5; "Immersion Hypothermia," Vol. 29, No. 1; "Cold Water Immersion," Vol. 31, No. 12; "Navy Problems in Cold Weather Medicine," Vol. 32, No. 10; "Frostbite," Vol. 35, No. 3; and "Frostbite," Vol. 38, Nos. 9-10.

Very resp'y,

Headmouse

Have you a question? Send it to Headmouse, U.S. Naval Aviation Safety Center, Norfolk 11, Virginia. He'll do his best to help.

Tower vs. Weather Station

WIND REPORT

THERE is a slight variation in reporting of wind by control towers as compared to aviation weather reports that should be recognized by pilots. All U. S. aviation weather reporting pro cedures are governed by the weather bureau manual of surface observations, and most wind-indicating equipment at major airports is of direct reading type connected to a single source. However, differences in orientation of indicated North, time period of reading, and other minor variations may sometimes result in slightly different wind values in the two observations, even though they may be made simultaneously.

As is well known, the weather observer's wind direction report is always with respect to *true* direction in order to facilitate interpretation of climatological data, weather maps, . . . The control tower wind direction indicator is oriented with respect to *magnetic* North so that the readings are comparable to magnetic runway directions. This usually brings about a slight variation in the wind direction reported by the two agencies and should be taken into account when evaluating reported wind direction.

The weather observer, in devoting a minute or more to studying the direction and speed indications —and sometimes counting the anemometer cup rotation—computes an average wind for a finite time period, but the control tower observation is necessarily integrated over a shorter period of time. Thus, while the weather observer's report is valid from an average standpoint, the control tower report should be more representative of the instantaneous condition of wind direction and speed. This should be helpful to the pilot in making a last-minute check on wind component to determine whether a particular operation is permissible.

Occasionally, particularly in very light winds, the degree of variability is not readily apparent in a tower wind report. As an example, if the prevailing wind condition is calm with an occasional light breeze to 5 knots, the control tower *might also report,* "Wind 5 knots." On the other hand, if the wind is actually varying regularly from calm to 5 knots, the control tower *might* also report, "Wind calm to 5 knots." Thus, in the first case, the prevailing wind is calm, and, in the second case, an average of 2½ knots would probably be most representative. This distinction becomes important only when the component is near the critical value for the runway in use—in such cases the tower could be queried as to what value is most representative.—*TWA "Flight Facts"* ●

truth and consequences

ILL WIND

Helicopter people who are sensitive to turbulence and terrain probably would have been extra cautious about searching the hill area under the existing wind and cloud conditions but the UF-1 is a pretty heavy, tough machine and it is apparent the pilots did not feel there would be any significant problems.

The UF-1 nosed eastward into a sparsely settled valley and at first it appeared to be just another piece of real estate to be checked for wreckage of a jet (the pilot had ejected and been picked up uninjured the day before). The UF-1 copilot said, "The clouds were ragged and low, providing about 300 to 500 feet flight clearance (distance between ridge tops and cloud bases) so I looked to the left and saw a lower saddleback with clouds high enough to provide plenty of clearance. Visibility was good in that direction and we were higher than the ridge—I could see the curve of the beach beyond the saddleback.

"We turned left (to 40°) heading directly toward the ridge . . . there was no excessive

turbulence." But unnoticed by the pilots a sink rate developed which full power was unable to overcome. Too late they attempted to reverse course. After a few degrees of turn the UF-1 hit a small spur sloping down from the ridge line. The impact point was about 300 feet below the 2400-foot saddleback.

Obviously, it is easier to look back and say what could or should have been done than to do the same thing in the cockpit with only split seconds to act. The accident board noted three cause factors in the crash; pilot, weather and terrain, but some circumstances are obscure enough to prevent anything more than this general breakdown.

Homebase for the UF-1 had been a coastal plain about 40 miles away from the search area. The search area itself included a section of steep, rugged coastline and an interior hill mass which contained many peaks and ridgelines 3000 feet high. Weather over the area was expected to be scattered to broken clouds 3000 to 3500 feet above sea level with 7 miles visibility. With this marginal weather over the hills, it was decided to concentrate on coastal water areas, searching land areas "to the extent that weather and terrain permitted."

Both pilots were mature aviators, each with about 3000 hours and plenty of hours in model. Neither was a stranger to the general area of operations and the left seat pilot had flown on two previous search missions in mountainous terrain.

At around noon on the day of the crash, the weather officer reported that the left seat pilot was given a briefing of expected weather conditions in the search area including a terminal forecast for home base. Surface winds at the air station were northeast 11, gusting to 17. At 3000 feet, the wind was easterly to southeasterly 30 to 40 knots. It is difficult to imagine that winds at this level would not be mentioned, at least for flight planning purposes enroute to the search area. At any rate the pilot apparently did not comment on the possible consequences in the hill area and neither did the weatherman specifically mention it.

Afterward, when the facts were in, the situation was reconstructed as follows: "Turbulence was probably present at various locations in the area but more especially at the mountain tops due to the strong easterly winds moving over very rugged terrain which would produce unstable air and eddy currents. The magnitude of such turbulence would vary from light to moderate and possibly severe depending upon the location, model aircraft, time of day, . . ."

The UF-1 was in a valley to the west (lee) of a 3200-foot mountain and "since the winds at mountain top were on the order of 30 to 40 knots normal to the mountain, it is quite probable that a 'mountain wave' or 'leeside trough' existed to the lee of the mountain top during the time the UF-1 was flying through this area. Normally, an aircraft under the influence of a mountain wave will experience downdrafts on the leeward side as a result of air rushing from higher pressure on the windward side to lower pressure on the leeward side."

It need not have been a full-blown mountain wave to have caused the damage. A strong downdraft or downslope wind could have done the same thing. Civilian pilots who fly converted military aircraft in bombing mountain forest fires with a water mixture get more than their share of low level mountain flying in strong winds. Their main training is learning to fly the air currents as well as the terrain.

Several hours after the crash a rescue helicopter approached the scene from downwind. The pilot reported the wind at 3000 feet as strong but with only light turbulence. "At about 1½ miles from the crash site," he said, "I was pulling max continuous power and losing altitude at a rate of 500 fpm. I continued toward the crash scene until I was about ½ mile from it. At this time I made a 180-degree turn because it was obvious that I would crash into the mountain if I continued.

Another helicopter tried to approach the crash scene from downwind with similar results. "The approach," said the pilot, "was started at approximately 5 miles from the crash at 3300 feet indicated. About ½ to ¾ of a mile from the crash site a strong downdraft was encountered which was surprisingly smooth. After 600 to 700 feet of altitude was lost and it became quite obvious that the helo could not approach the crash site from downwind, a 180 turn was executed."

An R4D-8 which had originally been on the same search as the UF-1 arrived in the vicinity about three hours after the accident. An attempt was made to proceed up the valley toward the crash but the character of the wind had changed. The R4D-8 pilot increased RPM and power and flew across the southern rim of the valley, below the clouds at about 2800 feet. "The air was extremely rough," he said, "requiring two hands on the yoke most of the time. Holding 120 to 130 knots and with 38 inches manifold pressure we were going down at about 300 to 500 feet per minute into the valley." A 180 turn was made and the R4D-8 returned to the coastline, the altitude ending up around 2200 feet.

This pilot said, "From the nature of the terrain and weather, we concluded that the direct cause of the crash must have been the downdraft . . . the shape of ———— Mountain, elevation 3200, just 3 miles

southeast of the valley in which the crash occurred, is rather like a dome, as opposed to being precipitous. With estimated winds of 35 to 40 knots from an easterly direction, it appears to be a perfect airfoil for creating a heavy downdraft of extensive proportions on its lee side . . . I can fully understand that flying mountainous terrain is always potentially hazardous and that this particular situation was a full size trap waiting for the unwary."

The word "unwary" as much as anything else may be the answer to the crash. Since it was a search mission, the pilot was likely to be looking out of the cockpit and not paying full attention to his flight instruments. At the same time there was an interruption on the flight deck which diverted the copilot's attention. A pilot, acting as observer, was seated in the radioman's seat immediately behind the copilot. He asked the copilot about the feasibility of spotting the wreckage in the hills. "I turned slightly to the right," said the copilot, "and was conversing (without the mike) about looking for such wreckage in the remote areas of the hills rather than near the cultivated fields and why we were going further north to continue the search.

"I recall turning around and visually checking forward of the aircraft one time and conditions were normal from an altitude-heading-visibility viewpoint. I continued my conversation with the observer. Suddenly, I heard the RPM start to change and looked around . . . I looked forward and we were nearly down to the ridge top level and close in . . ."

In discussing what might have prevented the accident he added, "Had my attention been focused on the situation our combined efforts (pilot and copilot) might have been more effective in preventing the loss of altitude."

Flight Line Trouble

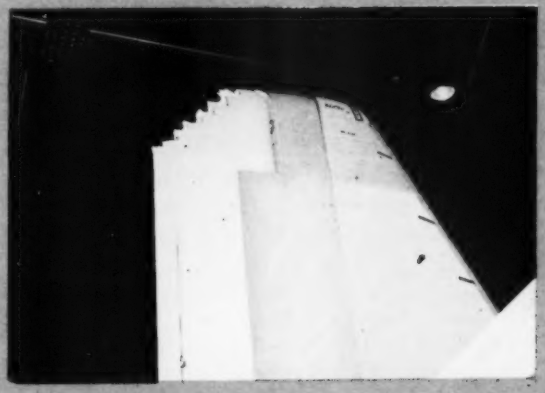
In the process of starting two F8Us for a night hop an area of spilled fuel was noticed near one of the aircraft so one plane was pushed forward from the flight line before being started. A portable fire extinguisher was also moved from its normal spot on the line so as to be available in case of trouble.

The first aircraft was started and it moved away toward the taxiway. The second aircraft was started in its normal position on the line and shortly thereafter the pilot taxied forward out of his spot. There was no moon and no ramp flood lights had been turned on; consequently the pilot turned on his taxi light.

After moving about 50 feet straight ahead the pilot stopped and answered a radio call from the first aircraft. While discussing a generator malfunction he turned off the taxi light then resumed taxiing. The taxi light was turned on a second time but not in time to detect the fire extinguisher which the ground crew had forgotten to return to its proper place on the flight line after starting the first aircraft.

The extinguisher hung up on the right landing gear door and was dragged 100 feet before a groundcrewman saw sparks and signaled the plane to stop.

"The experience of others is the cheapest experience we buy."—Anon



PINKING SHEARS?—Unique stair-step design in this S2F rudder is not a recent ASC but is the result of a slight miscalculation during an in-flight gear check on another S2F.

With an unsafe indication on the nose wheel, No. 1 requested No. 2 to advise as to the positive position of the barber-poled nose wheel. No. 2 moved in on the port side, continued forward, below and close abeam some 30 knots faster than No. 1.

The PC was flying No. 2 from the right seat. He looked up and out of the side window and noted the nose gear on No. 1 was actually down and locked. A slight amount of forward pressure was being held on the yoke (nose-up out-of-trim condition) and as the pilot of No. 2 moved his right hand to actuate the mike button his aircraft commenced a slight climb. Following which, the rudder cap on No. 2 was struck seven times (count 'em) by the port prop blades of No 1.

A Crusader Pi

I AM a United States Navy *Crusader* Pilot. My life is dedicated to
shall deter me from my unwavering dedication to my duty except
me the faith of its people by training me to fly faster while doing less
the weather is CAVU, to insure that this sacred trust shall not have
allow anyone in my gene

● I can fly 1000 miles per hour.

● I can carry

I do hereby solemnly proclaim to observe faithfully the ensuing code

1. Whenever Naval Aviators congregate in drinking establishments, I shall endeavor to conduct myself in a loud and obnoxious manner, especially if less fortunate, low performance type pilots are present.

2. While deployed (and not yet off-loaded) I shall strive to maintain the long cherished tradition of day fighter pilots by attending every nightly movie, regardless of whether or not I am capable of following the plot.

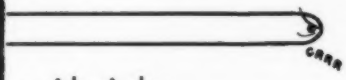
3. I shall not permit the infrequent interruptions introduced by occasional annoying flights to prevent me from maintaining my proficiency in acey-ducey on a par with commonly accepted fighter pilot standards.

4. I will never go ashore without my F8U lapel pin and my baseball cap.

This is my creed and these are my
burner, I shall do my utmost to justi
been placed upon my shoulders, e
lunch-time.—*A Sidewinder from V.*

Pilot's Creed

protecting the skies of America between sunrise and sunset. Nothing clouds, darkness or inoperative TACAN. My country has invested in than any other pilot in the world. I shall always do my utmost, provided been placed in vain. I shall never for a single moment forget, nor ral area to forget, that:



a sidewinder.

- My wing goes up and down.

of professional ethics, commensurate with my current elevated status;

5. I will not bolter.

6. If, however, I should bolter, I will ascertain that an assorted variety of colorful alibis and excuses are readily available for explanation.

7. I will wear my space suit and helmet for all airshows, dependent's day cruises, PIO pictures, and those operational flights which do not require any movement in the cockpit. (Providing someone helps me in and out.)

ideals. With the aid of my after-
fy the faith and confidence that has
ven to the extent of flying during
4-145 (AD drivers)

Editor's Note: Except for the italicized comments, the following account of the cat shot, ditching, water survival and rescue is taken almost verbatim from the pilot's account of his experiences.

'THIS IS IT!'

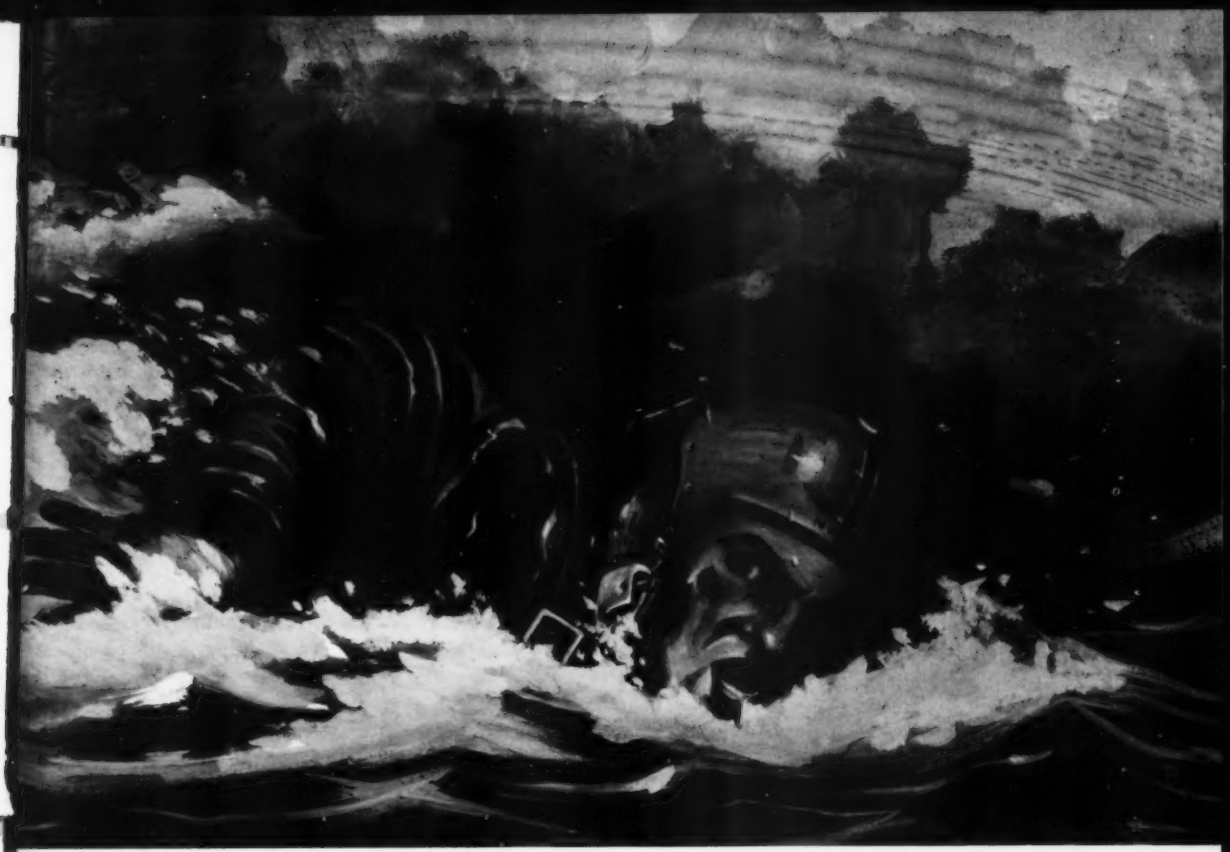
It appeared as though it was going to be another ordinary predawn winter launch with the ship pitching and rolling due to a high sea state and the Mediterranean blackness made even more menacing by a piercing cold wind. I was the pilot of an AD-6 on a scheduled low-level mission. I finished my preflight checks and indicated that I was up for flight to the taxi director who then taxied me up behind the no. 2 catapult.

Shortly thereafter, the tower came up on the radio to say that the ADs would be launched with no flaps. I flashed affirmative to the weight director's sign which read 20,300 lbs. as the taxi director began taxiing me onto the catapult. Soon the holdback snugged-up and I saw the director give the tension-up signal shortly before he passed me over to the catapult officer.

The cat officer gave me the "30 inches" and then "full-power" signals. Before flicking on the external lights, signaling that I was ready to launch, I checked the instrument gages, all of which appeared normal. A second later, the cat officer gave me the "suspend launch" signal and I retarded my power to about 1400 rpm, at first suspecting that my external lights were not functioning properly. I rechecked my switches and circuit breakers and then radioed the tower that I was still up for launch as far as I was concerned. This transmission the tower rogered and shortly thereafter I saw the taxi director give the "tension-up" signal again. I was passed back to the catapult officer who repeated his "30 in." and "full power" signals, both of which I complied with. I noticed no abnormal engine indications or operation on either turn-up.

I flicked on my external lights again, positioned my head against the headrest, and tightened my grip on the finger hold, freezing the throttle quadrant controls in the full forward position with the heel of my left hand. As I tried to penetrate the unknown blackness just off the bow ahead of me my peripheral vision caught the green arc of the cat officer's launching wand—up, around and down to the flight deck.

The initial acceleration of the cat squashed me back into the seat. Then I heard a loud crack under my port wing followed by a thump. A profusion of sparks whipped by the port side of the cockpit and over the port wing. I was wrenched to the right and remember looking out over the starboard catwalk as



the plane careened toward the starboard side of the flight deck. It felt as though the plane was skidding sideways down the deck so I threw full left rudder trying to bring the nose back forward, all the time maintaining full power. The nose had almost come back to a straight forward position as the deck edge lights whipped out of sight behind me.

At about this same time I remember glancing at the airspeed indicator which appeared to be indicating something in the vicinity of 60 knots, but stick movement forward or aft produced no effect whatsoever, and I felt the nose dropping through dragging me right after it. I strained my left arm against the throttle hoping full power might pull me out and I remember thinking "Hang on!" just before striking the water in what seemed to be an almost perpendicular attitude.

The initial shock threw me forward against the shoulder harness and I felt the plane tumbling over on top of me as I gulped a mouthful of air. Almost immediately, a slapping shock of cold water crushed me back into the seat. I knew the plane was upside down, but could see nothing in the blackness. I felt for the seat belt clasp and unlatched it, then grasped the forward canopy bar and pulled myself out of the cockpit in a Dilbert Dunker type escape.

I came out of the cockpit quite easily and popped to the surface just as the towering bow of the carrier seemed to descend down upon me. I thought I felt my hardhat glance off the starboard side of the bow as I began fighting to get away from the ship and escape the screws which were all I could think of at the moment. My struggling was to no avail, however, as the sea continued to toss me against the ship's side.

As I approached the stern I felt a current grab me and pull me down under the ship. I thought, "This is it!" Then I was popped up in the turbulence and froth of the ship's wake. Over my left shoulder I saw the gray shadow of the AD's tail slip down out of sight.

Silence and relief descended upon me all at once and I began to take stock of my situation for the first time. My Mark 4 antiexposure suit had been keeping me afloat with no difficulty, but I had taken some water inside of it due to the neck ring I was wearing. A number of long flights recently had given me such bad headaches that I had decided to wear the neck ring although the squadron recommends that

it not be worn. I immediately took it off and threw it away.

(A neck ring in an antiexposure suit destroys the suit's watertight integrity and defeats its designed purpose. Wearing a neck ring in the antiexposure suit is a very dangerous practice and is not authorized.)

Then I undid the legstraps of my parachute harness, experiencing some difficulty due to the slickness of my flying gloves and then inflated my mae west. I had forgotten to first unbuckle my parachute chest harness and when my mae west inflated, the buckle was pushed up against my chin making me quite uncomfortable. *(Standard procedure is to release the parachute chest straps before inflating the life vest.)* I undid this clasp but left the parachute shoulder harness on, thinking that this would make the pararaft more accessible. *(When the pararaft lanyard is connected to the Mk-2 life vest, the pilot can discard the parachute harness assembly.)*

About this time, I heard an aircraft approaching and I felt for a night flare. Barely a month before, we had an All Pilots' Meeting which stressed the problem of finding articles on the mae west in the dark. I quickly pulled out a flare, felt for the night end and ignited it. I also turned on my mae west one-cell flashlight. Soon after that I heard the pilot of the approaching aircraft gun his engine indicating that he had me in sight.

(The AD pilot had forgotten to load his .38 revolver with tracers prior to manning the aircraft. He was unable to load the revolver in the water because his gloves did not provide enough friction for him to remove the bullets from his belt.)

My fingers were getting quite cold and stiff by this time and I pounded my hands together for a few seconds to get some warmth back into them. *(His Mk4 antiexposure suit gloves were in a leg pocket but he failed to don them.)* I then attempted to get the pararaft out, but the lanyard kept slipping through my hands because they were stiff and the summer flying gloves were slick. Finally, I managed to get the seat pack up in my lap but I could not get my hand down into the pack to pull the inflation toggle. *(If the pilot had been able to actuate the toggle without first disengaging the quick release mechanism and removing the raft from the container, the raft might have ruptured.)* Next I tried to depress the buckle which holds the pararaft in the seat pack, but my fingers were so stiff I couldn't exert any pressure.

(The pilot did not follow the proper steps in attempting to inflate his life raft. He should have 1) disengaged the quick release mechanism; 2) pulled the raft container out; 3) followed the lanyard to the inflation cylinder; and 4)actuated the cylinder toggle to inflate the raft. Only three weeks before, he had attended a PK-2 life raft demonstration in the ready-room under reduced lighting conditions to simulate a night survival situation. As a result of his accident, the command in question is emphasizing "more survival training under more realistic situations.")

The sea was tossing me around a great deal, and I was now having trouble holding my head above the water as the antiexposure suit was keeping my feet floating on the surface making it impossible for me to tread water.

I saw the lights of a destroyer bearing down on me and I ignited another night flare. While it was still burning, two or three searchlights centered on me and I could hear men shouting. I slipped out of my parachute shoulder harness, undid my pararaft lanyard and started swimming toward the destroyer.

(Obviously the pilot should not have discarded his life raft and survival gear so prematurely. A survivor is not rescued until he is safely on deck aboard ship.)

They threw out a lifeline which fell just behind me and I grabbed it with my left hand. The rope slipped through my stiff hand and I ripped off my slippery gloves as fast as I could. The kapok float at the end of the line was now next to me and I grabbed it and hung on with all my strength. The destroyer was still steaming forward at a high speed and I was towed along beside it feeling much like a spilled water skier behind a motorboat. Another line was tossed down to me but I didn't have the strength to grasp it.

I saw a figure jump from the side of the destroyer and then a second figure. Somebody grabbed me around the neck just as I lost hold on the first lifeline and went under for what seemed like an eternity, finally struggling back up to the surface. I felt the arm around my neck tighten and heard somebody shouting "the ladder, the ladder. . . ." I was so exhausted by this time that I could barely move but somehow I managed to loop my arm over one rung of a Jacob's ladder which was right beside us. I felt myself being hoisted up the side of the ship and then felt a number of hands grasp me just before I was lifted over the side railing. After a slight case of nausea, a hot shower and some hot coffee I was picked up by a helicopter and was returned to the carrier. . . . ●

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'HERE I GO!'

THE ensign's second flight of the day was to be a simulated instrument hop in an F4D. The thorough briefing covered everything on the flight including GCA and emergency procedures.

After checking the yellow sheets and preflighting the aircraft, he started the engine and began the normal checks with the plane captain. When the chase pilot's aircraft went down because of radio difficulties, the ensign shut down his engine until a replacement was available. When he started up a second time, all checks were again normal.

Takeoff was uneventful. Climbout was straight ahead from duty runway 13 to the southeast operating area, the ensign first and the chase pilot following. At 3,000 to 4,000 feet, the chase pilot cleared the ensign to go hooded.

The ascent continued on climb schedule and straight ahead until they reached 14,000 when, because of a broken cloud haze layer at 18,000, the chase pilot directed the ensign to turn port to a heading of north. As the ensign turned, he heard two loud bangs and the stick became extremely stiff. He reported this to the chase pilot who told him if he was still hooded to go visual and stow the hood out of the way.

In spite of all the pilot's attempts to remedy the situation, the stick became increasingly more difficult to move and finally froze in neutral.

The two F4Ds flew around in the vicinity of the field to burn down. When the external tanks were empty, the ensign put the speed brakes out and went into burner. He could fly it "fairly well" using trim and rudder. When he had burned down to about 2900 pounds, he put the landing gear down to check the slow flight characteristics, pulling the power back to about 80% and using speed brakes. When the plane started descending, he used the emergency trim to get it level. As he lowered the landing gear, the aircraft commenced a violent yaw back and forth and then flipped upside down. Although the chase pilot told him to get out, the ensign decided since he was at 14,000 feet to try to get the aircraft righted. He managed to get it straight and level and in a climb when the yawing started once again.

Fearing the aircraft would enter a spin before he could eject, the ensign decided he'd better leave it then and there. He positioned himself back in the seat and took off his knee board. The chase pilot heard him say, "Here I go," and suck in an audible breath as he pulled the face curtain.

Here are excerpts from the ensign's narrative:

"When the drogue chute opened, it put me face down toward the ocean. The main chute opened without much of a jolt which surprised me. After the main chute opened, I felt my limbs and moved them. Only my neck hurt—it felt as if it were broken or pretty badly sprained. I had to hold my head up with my hands in order to keep it from hurting. (Medical personnel later attributed the pilot's spinal injury to possible improper positioning before ejection or force applied to his head by the uncontrollable yawing movements of the aircraft at the time the seat fired.)

"The parachute descent seemed to take an awfully long time. There was no sensation of falling until about the last 500 feet or so. Then I noticed I was falling pretty fast and drifting backwards, so I put my hands on the quick release fittings. As soon as my feet hit the water, I released the parachute. While still under water, I pulled both CO_2 toggles of my life vest and quickly bobbed to the surface.

"Before hitting the water I had taken off my oxygen mask and let it drop. I had tried to remove my helmet but this was so painful that I left it on. I was still holding my head in an upright position with my hands.

"After coming to the surface, I unbuckled the two quick release fasteners on my seat pack and got it out in front of me to inflate the raft. It floated well but I didn't know how to get the life raft out of the pack. I had been shown where the raft was and how to inflate it but I had never been shown how to get it out of the pack or somewhere along the line I had missed it.

"I unzipped the seat cushion and finally found the D-ring and pulled it. Finally I got it to come out and got hold of the CO_2 bottle and pulled the little cord but nothing happened. I pulled the toggle again until the lever came up 180° to the stowed position and still nothing happened. I thought of blowing the raft up orally but then I decided that I couldn't climb into it anyway. Because my head was hurting so much I abandoned the raft. (Although the raft was not recovered, it is thought that the valve lever was broken or a leak had developed in the valve assembly allowing the CO_2 to vent to the atmosphere so that at the time of actuation there was no pressure in the cylinder.)

"By this time I could hear the chopper although I couldn't see it. I couldn't raise my head but I knew he was there. I tried to signal him that I had a bad neck. The helicopter pilot and crewmen were extremely good and brought the seat right under me. I didn't have to move an inch. All I had to do was put my arms around the shank of the seat and I was hoisted up into the chopper. Throughout the whole situation everyone helped out as much as possible."

Here is a rundown on the major survival aspects of this accident:

Flight Gear: The pilot was wearing all standard and prescribed flight clothing including the anti-G suit, oxygen mask, helmet with Hardman fittings, chin strap and nape strap and integrated harness with Mk3C life preserver.

Life Raft: All items of survival equipment functioned properly except the life raft. Because of the SAR team's prompt and efficient rescue work and the fact that the pilot had a good life vest, the malfunction of the life raft did not affect the pilot's survival. However, it is easy to visualize what might have happened to this injured pilot without a life raft if his rescue had been delayed.

Flashlight: In this squadron a flashlight is required only during night flying. There is no provision for a flashlight on the Mk3C life vest or on the integrated torso harness suit. Had this pilot's rescue been delayed until after dark, he would have been without this valuable signal device.

Pilot and Tracers: The pilot was not carrying a .38 cal. service revolver with tracers as required on all flights by squadron instruction. Normally he does carry this equipment but he had just been fitted with a new Z-3 anti-G suit and had inadvertently left his revolver in the survival shop.

Knife: He was carrying a standard survival knife but had no occasion to use it.

PSK-2 Kit: The pilot did not carry his PSK-2 personal survival kit while flying the F4D-1 because he was under the impression that these kits were packed in the seat pan for that aircraft. This is not the case. Squadron policy requires that the PSK-2 kit be carried by pilots on all flights.

Survival Training: The pilot was current in all his survival training except for the underwater oxygen breathing indoctrination which he had never received. (The Dilbert Dunker at the station had been out of commission for maintenance ever since he had been in the area.)

A short time before the accident, the pilot had undergone a dry run in the F4D-1 ejection seat as well as parachute drop and live helicopter pick-up utilizing a large floating crane, the integrated harness, the Mk3C life vest and the SAR helicopter. (The SAR helicopter was the same one which made the actual rescue after the accident.) The pilot commented particularly on the effectiveness of this training in that he knew what to do, when to do it and what to expect when he did it.

Flight Surgeon's Comments and Recommendations:

- All squadron personnel should be reinstructed on release of the seat pan and PK2 pararaft container from the parachute harness, release of the pararaft from its container and operation of pararaft inflation gear. This instruction could be given on an individual basis in the survival shop as pilots are fitted for integrated harnesses.
- It must be continually re-emphasized to flight personnel that safety and survival gear must be *available* when needed and must be *used* to be effective. No item of safety or survival equipment is issued to the fleet without considerable time, money and thought having been expended on its development. No one item or procedure is going to be universally satisfactory but those items and procedures which are available and required are the best we have and should be utilized until something better comes along.
- More effort should be made at the squadron level to ensure that each man finds a place in his flight clothing to comfortably and safely carry both parts of the PSK-2 personal survival kit and that he forms a habit of carrying this kit with him on all flights.
- It should become a squadron requirement that a waterproof flashlight of the type used on the Mk2 life vest be worn on the integrated torso harness suit.
- The importance of not abandoning any equipment unless absolutely necessary in a survival situation—no matter how useless the equipment may seem at the time—must be re-emphasized to all flight personnel.
- The importance of proper preparation and positioning prior to ejection should be repeatedly brought to the attention of all flight personnel.
- The pilot and aircrewmen of the helicopter carried out the rescue in a highly professional manner. ●

KORSWIMSINKORSWIMSINKORSWIMSIN

Drastic action to improve the water survival performance of pilots and aircrewmen seems to be in order if the following report of aviation physiology training unit is typical:

Of the 1,049 pilots and aircrewmen who went through the unit's water survival training program for fiscal year 1962, 235 or 22.4% failed. Overall, pilots scored better on water survival training than aircrewmen—6.9% failure as against 34.9%.

Failures in different areas of testing were as follows:

Qual. Swim #1 (250' free style)	31%	failure
Qual. Swim #2 (250' on back)	20%	"
50' underwater swim	37%	"
75' surface oil swim	23%	"
75' burning oil swim	45%	"
Concussion swim	24%	"
15 minutes endurance	16%	"

As far as swimming goes, this seems to indicate "physical unfitness."

Pressure Suit and O_2

UNOFFICIAL reports relayed by low pressure chamber personnel indicate that some pilots in full pressure suits have been flying at 5000′ with the oxygen regulator OFF. This breaks the face seal; with the clear visor still down they get cabin air flow only. When these pilots decide they want to zoom up to altitude, they have their clear visors down and with their training and conditioning to equate *visor down—oxygen ON*, they forget they have turned their oxygen OFF.

As one pressure chamber instructor put it, this is 0.0 headwork—4.0 headwork requires that when the full pressure suit helmet visor is *down*, the oxygen should be *ON*. Furthermore, OpNav Instruction 3710.7A requires use of oxygen from takeoff to landing in jet aircraft.

AD Signal Hazard

IN separate incidents recently, two AD pilots narrowly escaped permanent injury when the aircraft canopies closed on their hands during arming operations.

It was the pilots' custom to put their hands on the forward canopy rail to reassure the ordnancemen that their hands were away from the firing mechanism. In both incidents, the pilot actuated the canopy closing handle and placed his hands on the rail before the canopy had fully closed.

Each man was lucky enough to be able to free one hand and open the canopy. With hydraulic pressure of almost 3000 pounds on the canopy closing mechanism, the pilots could have lost their fingers. As it was, they suffered only minor bruises and scratches.

To eliminate this potential hazard, the safety council reporting these two cases recommended that during arming procedures pilots place their hands on the gunsight keeping in mind, of course, that the gunsight is not a handhold and that no stress should be put on it.

Common Sense

AN A4D pilot who ejected into 46° water at night was unable to locate the ring to open his raft pack because his bare hands were almost useless. Although it was the end of November, he was wearing a summer flight suit and summer flight gloves; he lost his gloves during the ejection. His hands were so cold and numb that he dropped his survival knife while he was trying to cut the raft pack open.

When the pilot saw that he had parachuted down near a populated area he shouted for help. He was rescued by residents of a nearby village after being in the water approximately 1½ hours.

A man without an anti-exposure suit in 46° water for this length of time has less than a 50-50 chance of remaining conscious. *Cold weather operations call for cold weather clothing—this is common survival sense.*

No Safety Precautions

A GROSS lack of proper basic safety and survival precautions on the part of the crewmembers became evident during a recent accident investigation, the reporting flight surgeon states.

"It is my experience," the flight surgeon continued, "that pilots and crewmembers alike in multi-engine aircraft for some reason feel themselves immune to accidents and therefore do not fully participate in the wearing and possession of proper survival gear. The emphasis for prevention of serious injury must be carried out at the crew level personally with the patrol plane commander basically responsible. . . ."

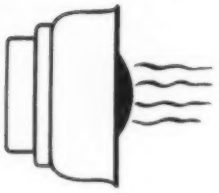
In two instances lap belts were not secured; flight suits were not worn; gloves were not worn by 8 of the 11 men aboard (although 9 had them with them); and survival knives were not carried. There was no deficiency in safety and survival education at the squadron level. The majority of the crew had attended a survival school within the past 2 years. Yet had this accident involved more than a plane halting with the nose in the mud after a 50-knot deceleration, the injuries without a doubt would have been greater.

Tied Up

DESCENDING into water after ejecting from an F9F-8T, a pilot found that his left foot was tangled in some kind of line restricting him in his attempts to tread water. He tried with both hands to unwind it. When this didn't work he pulled out his survival knife from its sheath on his right thigh, cut the line and was free.

Talent

LACK of a whistle did not handicap an A4D pilot who ejected overwater at night recently. . . . He whistled piercingly loud and clear through his teeth. The skipper of the destroyer which picked him up stated that after the pilot's two flares had given the ship his approximate location, the whistling was the best indicator of his exact position. ●



from the Air Boss

Approach Terrain Briefing

It was proposed that a complete briefing folder for strong fields be maintained with pertinent information that is not compiled in the Enroute Supplement. Since safety is paramount items which are peculiar to terrain and approaches should be available to the new aircraft commanders.—*FAIReConRon 1*

Letdown Spot

The recommendation was made and concurred in that unless occasioned by operational necessity or emergency, troop or cargo loaded helicopters not be required to land on spots on deck between two parked helos.—*USS VALLEY FORGE Safety Council Meeting*

G2 Compass Setting

During night Carquals several instances have occurred where pilots have neglected to set their directional gyro prior to launch. This necessitates "no gyro" CCA control. This problem can be overcome by reiterating to pilots the effect of a gyro stopping on one heading and then being turned up on a different heading due to the ship having turned. Pri-Fly will give the present ship's heading and the Foxtrol Corpen prior to launch so that the pilots may properly set direction gyros.—*USS FRANKLIN D. ROOSEVELT*

Elevator Guard Rail

On one occasion a helicopter was observed lifting from No. 4 spot alongside No. 1 elevator while the elevator was down and the guard rail raised. The possibility was pointed out of the aircraft swinging its tail wheel into the guard rail on takeoff. The recommendation was made, and concurred in by all present, that takeoffs and landings from Nos. 3 and 4 spots not be made with the elevator guard rail raised except in emergency or necessary tactical situations.—*USS VALLEY FORGE Safety Council Meeting*

Seat Time

Information was requested relative to allowed seat time for pilots in the operation of Marine helicopters. It was explained that the maximum allowable was six hours continuous flying, or four hours, followed by two hours rest then four more hours. If a pilot totals eight hours in one day, he may then only fly four hours the following day. With the numbers of pilots assigned to the squadron, this imposes a major limitation in flight operations during exercise landings and administrative offloads.—*USS VALLEY FORGE Safety Council Meeting*

CO Poisoning

During operations a helicopter made an emergency landing because of suspected carbon monoxide inhalation by the crew. After takeoff the pilot had noticed increased heat in the cockpit and smelled exhaust gases. After 20 minutes in flight, the copilot became nauseated and dizzy. The pilot also experienced dizziness and the sonar operator was affected to a lesser extent. An emergency was declared and a safe landing effected.

Medical examination indicated carbon monoxide poisoning. The apparent cause was the fact that the plexiglas sonar window on the HSS-1N was missing from forward of the sonar station. This caused exhaust fumes to enter the cabin and be circulated throughout the aircraft—*Helo AntiSubRon 5*

Flight Deck Safety

The Flight Surgeon stressed the point of deck safety as an all hands responsibility. It was noted that there were too many cases recently of people getting foreign matter in their eyes, indicating they were not wearing goggles as required. The importance of having the pilots and flight deck personnel keep their helmets on with goggles down when on the flight deck and aircraft are turning up was stressed again.—*USS INDEPENDENCE*

Tiedowns for Yellow Equipment

Cable and/or chains have been welded to the equipment to make it readily available. It is a continuing problem to keep personnel from breaking the tiedown equipment rather than releasing it in the proper manner.—*USS INDEPENDENCE*

MAD Boom Damage

Improper use of tow bars has resulted in damage to MAD booms during movement of S2F-3 aircraft.

Recommendation: A good safety inspection of all tow bars be made prior to use. Make certain the cross piece is in the proper position.—*USS RANDOLPH*

Safety Equipment for Flight Deck Personnel

Attempts are still being made to procure some type of compact flotation device for handling crews. A small canvas packet containing a one-cell flashlight and whistle has been issued to all flight deck personnel. This container is worn on the belt when at flight quarters and should prove useful in the event of "man overboard."—*USS INDEPENDENCE*

Range Roundup

Report of Gibson Girl transmitting capability: The Coast Guard Air Detachment reported transmission range of the Gibson Girl to be only 2 miles at 5000 feet when operating on the R5D aircraft's flat top antenna. With the aircraft's trailing wire antenna, range was 15 miles, and when utilizing the antenna of the Gibson Girl, signal strength was "5" out to 100 miles. All pilots are reminded that this is an alternate emergency method of transmission on 500 kcs and 8346 kcs and can be used when required. This information is available in OpNav Instruction 3730.4 (USCG-CG306), Aircraft Operating Procedures Over Water, which should be reviewed by all pilots.—*ComFAir Argentia*

MAINTENANCE SYSTEM CHANGES

Whenever anyone mentions the new Naval Aircraft Maintenance Program (NAMP), the thought immediately comes to mind that this is merely a changeover from the old FASrons (Fleet Aircraft Service Squadrons) to the air station AMDs (Aircraft Maintenance Departments). Actually the formation of the AMDs at each naval air station is only one part of the program.

Additional important changes have also been made in NAMP:

- Establishment of a more standardized Maintenance organization and system.
- Designation of all maintenance activities by work levels.
- Implementation of Calendar Inspections for Aircraft.
- Changeover to PAR (Progressive Aircraft Rework) instead of Aircraft Overhaul.
- Establishment of a component repair system (i.e., repair of carburetors, fuel pumps, magnetos).

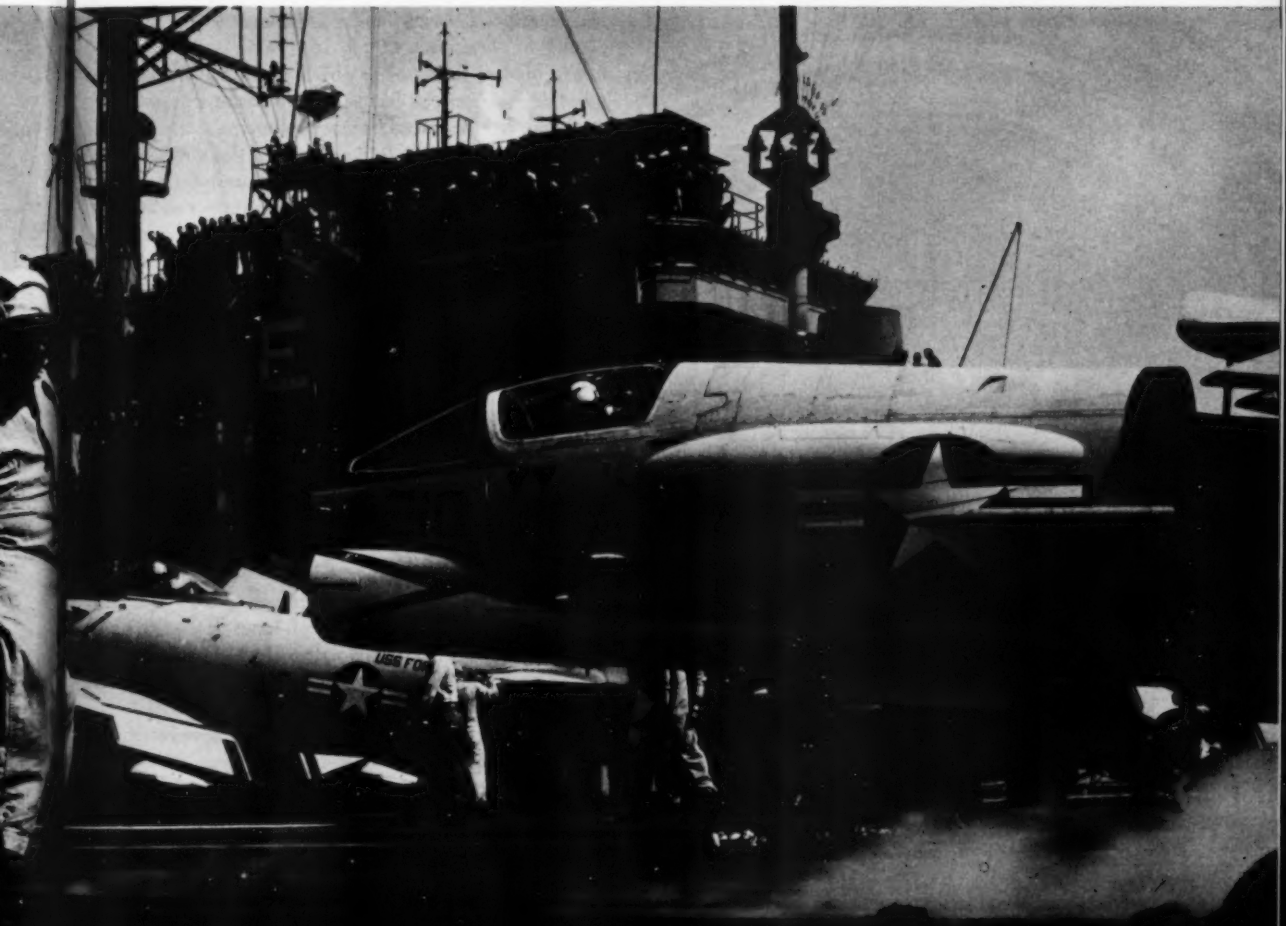
Other important aspects of the program include establishing better means for maintenance of ground handling equipment, all keyed to greater operational capabilities.

Men and Equipment

All this has come about because of the necessity to keep abreast of modern aircraft technology, complexity of aircraft and equipment, and the astronomical expenses associated therewith. The job re-

by CDR A.L. Rasmussen

Over the past few years a new concept of naval aircraft maintenance has been evolving to meet the ever increasing demands of modern piloted aviation. The change has been gradual enough to prevent any loss of operational capability and, therefore, has gone almost unnoticed by many. A recap of the more important aspects of the system reveals the extent of change and the importance of aircraft maintenance to the success of Naval Aviation.



quires (and gets) the coordinated efforts of a large ground establishment consisting of the highest skills and training that the Navy can provide.

Proper organization, leadership, standardization, motivation and initiative are the weapons utilized in this heroic war against "maintenance error" and material failure.

Maintenance mistakes are unacceptable since they often end in costly accidents. The "enemy" is the complexity of thousands of moving parts, valves, wires, tubes, blades, lines, . . ., which drain the life-giving oil, fuel and power from a small cramped package enclosed by the clean, innocent-looking lines of an aircraft. And all this is delivered at the cost of $60-$200 per pound excluding fancy trimmings.

The Navy and Marine Corps maintain nearly 200 models of aircraft of all sizes and shapes. Thousands of pieces of ground support and test equipment are required to keep these aircraft operating. It's not hard to see why the total force of all units directly associated with maintenance number thousands of men.

Maintenance Levels

All naval aviation maintenance activities are classified by a level of maintenance work accomplished. A—PAR or overhaul; B—Special; C—Component Repair; D—Shop; E—Hangar; F—Line.

Fleet patrol squadrons are assigned "D, E, and F" level maintenance with "E" and "F" facilities. "D" facilities to these squadrons are provided by the AMD. VU and VR are similarly assigned "D", "E" and "F" level maintenance but have "D," "E" and "F" facilities. AEW is the largest squadron in the Navy and the *only* one assigned "C" level maintenance and facilities.

AMDs "C" level activities with some special "B" functions, including complete jet engine repair and test; extended preservation and shipment of aircraft; and light production type work involving major aircraft disassembly. Units aboard ship are assigned similar work levels. The "A" level of work is reserved

CDR Rasmussen graduated from the Naval Academy, Class '43. Served during World War II on a World War I DD in the Aleutians and Solomon Islands. Flight Training in '44 with a year as instructor in PBY's. VP-47 for two years in PBM aircraft. PG school 1948 to 1951. Graduated Univ of Minnesota with MS in Aero Engineering. VP-44 from 1951 to 1953 in P5M aircraft. Then headed the M&M Dept at NASC until 1956. BuAer and BuWeps followed as Head, Shaft Power Engines Branch where he had a lot to do with improving the R1820 and R3350 engines, the new detergent (dispersant) oil, chip detectors, and new engine developments such as the T-58 and T-64. He reported to ComFAirHawaii in July of 1960—holds down the job of Asst Chief of Staff for Maintenance and Material.

for the PAR or rework activities only.

All naval aircraft are inspected at routine intervals by the squadron or unit (referred to as custodian) to which it is assigned. These inspections include preflights, daily, special, minor and majors. Routine inspections were previously accomplished on a flight-hour interval but are now almost totally done on a calendar basis. This system has had the effect of stretching out periodic maintenance intervals, thereby reducing overall maintenance man-hours required and aircraft time "out of commission." Also the planning of aircraft maintenance has been greatly simplified and more evenly distributed.

Progressive Aircraft Rework

Overhaul of aircraft is rapidly becoming a thing of the past. The overhaul of complete stripping, teardown, and rebuilding of aircraft once involved many months of man-hours, imposed tremendous cost and deprived the Navy of many hours of aircraft life. This process has been superseded by a system of progressive aircraft rework. The intent of this change is to enhance fleet readiness by scheduling aircraft through rework activities at more frequent intervals and thereby insure that aircraft are maintained in a high mission-ready status at all times.

Under this system, squadrons are required to keep their aircraft in mission-ready condition at all times even when sent to PAR. Progressive aircraft in work includes those items beyond fleet and AMD capability. Custody of the aircraft remains with the squadron before, through, and after PAR.

PAR facilities are class "A" activities which include the Lockheed Air Service Facility Honolulu (LASH) for airline maintenance of AEW WV-2/R7V-1 aircraft; Fairchild, St. Augustine, Florida, for VR R6D/R5D aircraft; and similar activities in Pensacola, North Island, Quonset Point, Alameda, Norfolk and even Japan for other models of aircraft.

Although seemingly a complex process, considerable time and money has been saved by the PAR system. For example, a P2V is now processed through PAR in 2-3 months, whereas the overhaul process for P2V aircraft used to take up to seven months.

Component Repair Program

In keeping with the concept of maintenance of the lowest level of capability and capacity, a program of screening and repairing of aircraft components has been established at AMD. Squadrons, within their means, repair all failed aircraft components. If beyond their capabilities, the component is sent to the next higher maintenance level and so on until overhaul point is reached.

The AMD and Supply have established screening units where an amazing number of pumps, valves, distributors, mountings, lines, leads, tires and other equipment undergo close scrutiny. Some of this equipment is repaired and returned to "ready for issue" (RFI) stocks, some badly needed items sent for local commercial overhaul, some are scrapped or salvaged for parts, and the remainder are returned to overhaul. The component repair system has been quite effective in reducing out of service time for many components, saving transportation costs to the mainland and increasing the availability of parts for aircraft.

Progress Goes On

The NAMP is by no means complete in its implementation as improvements and progress are still underway. A large manual is being prepared for distribution by BuWeps which will outline the whole program and become the "Bible" for naval aircraft maintenance. The important thing to realize is that maintenance is making progress, is important and requires many frustrating hours of work.

Men and money have always been scarce commodities in Naval Aviation so increased efficiency must take up the slack to support the complex gold-plated monsters we live with. Since no one has cornered the market on brains it is not likely that we will reach perfection but that is the ultimate goal of the NAMP. ●

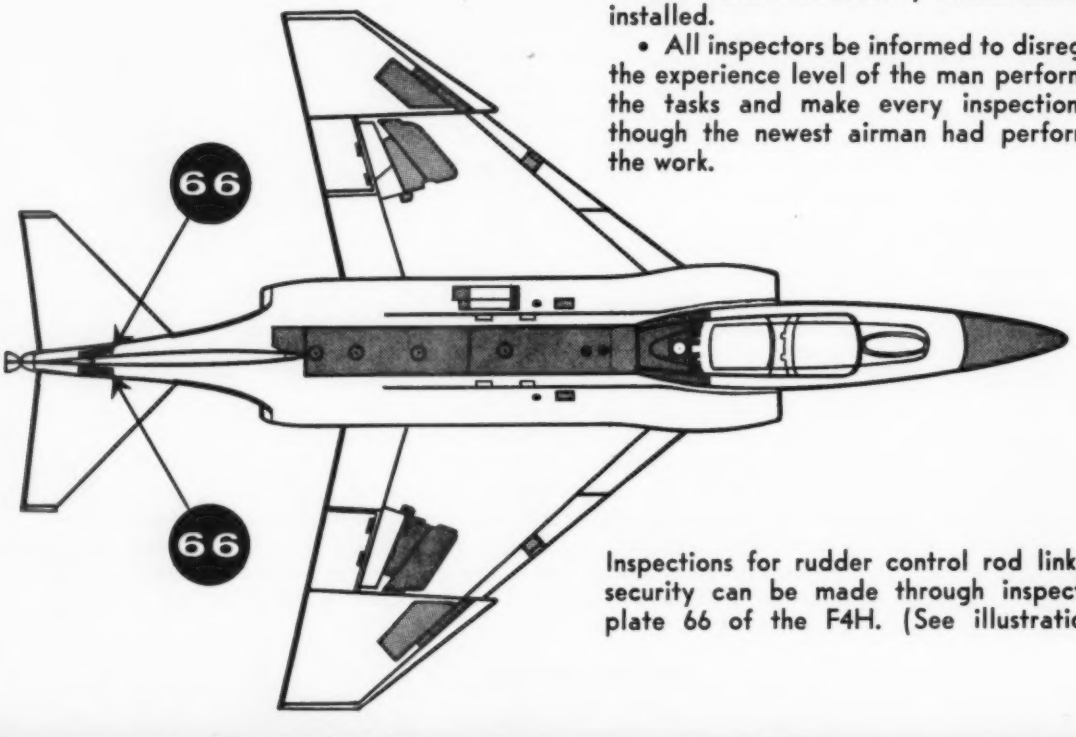
Experiencing rudder control difficulty in an F4H, the pilot and RIO ejected successfully when the jet rolled uncontrollably—the 3.7 million dollar aircraft crashed into the ground.

Investigation revealed the rudder control rod disconnected from the rudder power control cylinder assembly (see photo). This situation causes hard over rudder. Investigators found a bolt, washers and castellated nut in the fuselage cavity containing the rudder actuator. The cotter was missing, allowing the the nut to vibrate off and the control rod to become disconnected. Total flight hours since this unit had been replaced was 33 hours.

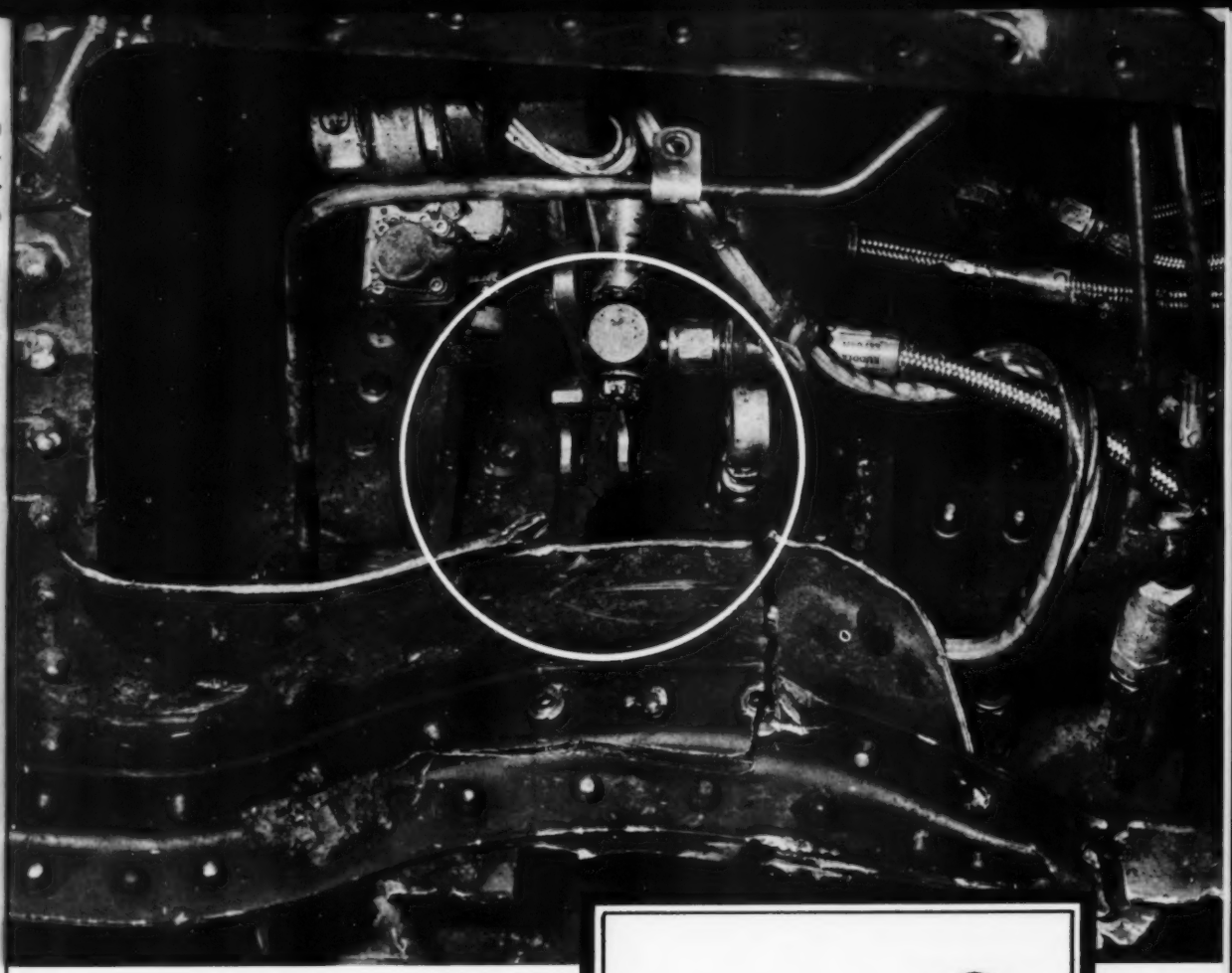
Investigators recommended that:

• Inspection criteria in NavWeps 01-245FDA-6-2 and 3 be revised in vital control linkage areas to include specific number and type of bolts, nuts, washers, cotter pins and lockwires required rather than use the catch-all phrase "inspect for security." This would require the installer and the inspector to make a count to determine if the correct number of security attachments are installed.

• All inspectors be informed to disregard the experience level of the man performing the tasks and make every inspection as though the newest airman had performed the work.



Inspections for rudder control rod linkage security can be made through inspection plate 66 of the F4H. (See illustration.)



MISSING!

Editor's Note: During the course of aviation history bolt-castellated-nut-cotter combinations have been the most reliable securing devices available. But accidentally omitted and overlooked cotters in critical applications such as joints in flight and power control systems make the device a treacherous booby trap. Countless aircraft and lives have been lost due to this type of maintenance error. Now, a new castellated nut featuring a nylon insert has been developed which offers a safety factor in the form of vibration damping action. Developments such as these could prove to be the greatest boon to aviation since the advent of shoulder harnesses. Please turn to Letters, page 44, see "Fail Safe Nuts." ●

Dry Chemical Fire Extinguishers

DESPITE the dramatic quality of Potassium Bicarbonate Dry Chemical (P-K-P) as a fire extinguishing agent, recent experience involving use of the Navy airlift type dry chemical extinguisher demonstrated the need to reiterate certain precautions in the use of P-K-P.

When properly employed, dry chemical powder is the fastest, most efficient and easiest to use fire extinguishing agent for Class B inflammable liquid fuel fires that is available to the fire fighter. *It has one drawback, however; its lack of permanency of extinguishment in fuels subject to reflash such as gasoline or hot jet fuel.*

Dry chemical acts very much like a gaseous fire extinguisher such as CO_2: the fire fighter must be able to extinguish *all* flames with his supply of agent or the entire fire area will be re-ignited when agent discharge stops or runs out.

P-K-P is non-toxic and is to be used principally on Class B fires, but can be used on Class A fires or Class C fires if the need arises. It should always be backed up with other agents such as water for Class A fires or foam for Class B fires.

A word of caution must be given regarding use of a dry chemical agent. It must be remembered that this material has no permanent holding ability against fire and sudden flashbacks can be expected. Personnel cannot work freely in fuel areas as is the case where the fuel can be covered with foam. Flashbacks will occur through improper operator technique, attacking a fire too large for the units' capability and exhaustion of the supply. Proper procedures and drills should be worked out to minimize the hazards involved insofar as possible.

Under average conditions, a 400-pound airlift dry chemical fire extinguisher, with both nozzles in operation, may be expected to extinguish fuel spill fire covering approximately 2000 square feet.

These characteristics should be brought to the attention of all personnel with duties in the flight line area. Particular emphasis should be given to the current state of training and knowledge of the contents of BuWeps Inst 11320.2 and BuAer Inst 11320.16 on the part of members of the crash-firefighting crews.—*BuWeps Notice 11320 - May '62*

Dash Training

TWO Naval Air Maintenance Training Group Detachments for the maintenance and operational training of the DSN-3 DASH helicopter system are currently completing factory training at the Gyrodyne Company of America at St. James, Long Island, N. Y. These detachments are being readied to train the fleet units in this newest weapons system, prior to delivery of the drone helicopter to the fleet.

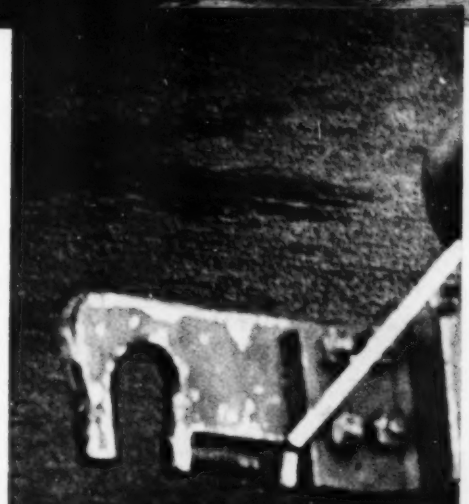
NAMTraDet 1019 (DSN-3) will be located at NAS Norfolk, and NAMTraDet 1020 (DSN-3) at NAS, North Island, San Diego.

Both detachments will instruct in all phases of maintenance, repair and operation of this remote controlled, anti-submarine weapon, which can be operated from nearly any platform. In this effort, both aviation and general service ratings will receive training because of the wide range of dispersal possibilities of the system. It is expected that a sufficient number of personnel will be thoroughly trained in the maintenance of this new Weapons Systems by the time fleet delivery is effected.

Quality Control

"A WORD of caution as we approach the beach: Often, after an at sea period, there is a tendency to relax and loosen up from the tempo of shipboard operations. It is not necessary for me to remind you that safety does not know the difference between being ashore or afloat. Let's maintain the high standards that we have set by each man continuing to leave each finished job secure in the knowledge that it is complete and that the work performed was the best he knew how to do. Remember, quality and safety cannot be inspected into a job, they must be worked into it!"—*CO VS-27*

It has been three months, seven days, five hours and thirteen minutes since the Navy lost an aircraft due to control cables being reversed during maintenance. It'll be too soon if it ever happens again.



TOWBAR TROUBLE — Damaged locking pin and locking pin holes combined with excessive towing speeding led to Aircraft Trouble. Solution — Inspection and maintenance of towbars; proper towing speeds.

MUGS WAS HERE!

MISCHIEF UNQUALIFIED GOOFS SKYLARKS

LETTERS TO APPROACH

Fail-Safe Nuts

Union, New Jersey—Re "Stop Nut Re-Use Problem" p. 43 June APPROACH. Apropos of this general subject, ESNA has just released design information on a rather unique new product. This is a line of nylon insert, self-locking castellated nuts.

MS33588 (ASG) has long prohibited the use of self-locking nuts at joints in control systems at single attachments; on any externally threaded part that serves as an axis of rotation for another part—such as bearings, bushings and pulleys. However, the new ESNA fastener combines the quality and high performance of the elastic stop nut with the extra insurance of a cotter pin, to provide what we have dubbed "a belt and suspenders" type of fastening.

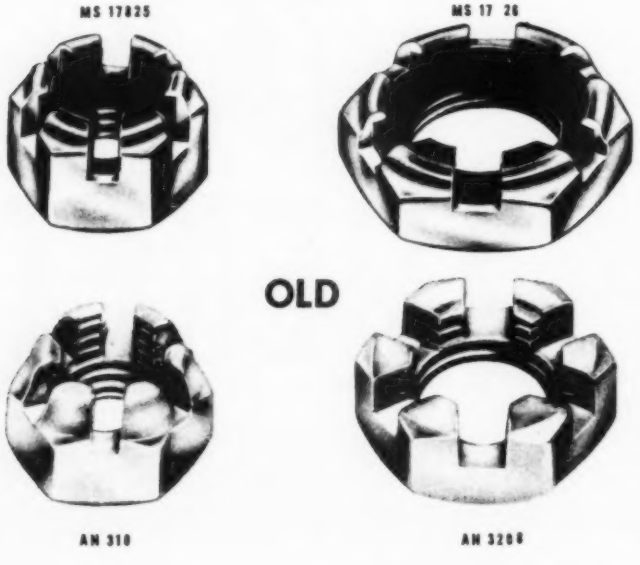
An insurance policy is no substitute for a reasonable degree of caution. However, it seems unlikely we'll ever be able to completely eliminate human error and until that time the double-barreled reliability of this new design seems to make good sense for critical applications.

Believe me, I'm not trying to drag this out. But in view of the editorial objectives of APPROACH I thought this very new concept might have true interest for you.

BRUCE F. LINCK
ELASTIC STOP NUT CORP.

• Amen! See "Route 66" page 40 for the report of one of the most costly accidents to date due to cotter pin omission.

Nylon insert self-locking castellated nuts add new dimension in safety and reliability.



About Standard Drawings

FPO, New York—I am inquiring about a safety poster, B26-G1-860 revised Jan. 1961. The label: "Identification Colors for Fluid Lines (AND 103-75)" what does the 10375 mean? I can't seem to find the answer and would appreciate your help.

JOSEPH YEARGIN, AM2
USNAF DIV-80

• AND means Aeronautical Design Standard Drawings. The number 10375 merely means that this drawing was 10375th as issued. There is no code meaning of the numerals other than grouping.

For instance, there are four types of aeronautical standard drawings used:

Drawings numbered AN1 through AN9999 are used to describe standard parts such as bolts, nuts and assemblies.

Drawings beginning with AND-10,000 are used to describe design information.

Drawings beginning with AN100,000 are used primarily for engine and propeller standard parts.

Drawings numbered MS ..... are known as Military Standard Sheet Form Standards.

Drawings beginning with NAF 1000 are known as Naval Aircraft Factory Standard Drawings.

For the Index of these drawings see NavAer 00-25-543.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

O-rings & Surfaces

NATO, APO 154—APPROACH June 1962 had an article by Saunders on O-rings. The article is very good. There is some confusion in my mind on the following points:

a. Page 35: the correct hardness is listed as 90A for pressures over 3000 psi. In the second column it states that hardness of 68A is optimum for 3000 psi.

b. Page 36: How smooth is a groove surface that is too smooth? It seems to me that a lubricated O-ring on a 16 surface would be the equivalent to an extremely smooth groove.

Please send 2 sets of the O-ring charts.

KENNETH J. POWERS
U. S. LIAISON OFFICER

• Charts are on the way!

(a) is answered on page 35 under "Fluid Pressure," but the opening paragraph could have included that the AN 6227 O-ring has a durometer shore "A" hardness of 70. The use of the anti-extrusion device (back-up ring) allows the use of the softer material in a 3000 PSI system which, as stated, reduces the breakout friction which is highly desirable in the exotic servo systems that are used in our modern missiles and aircraft.

(b) A groove surface is too smooth when it does not furnish the gripping action that will prevent the O-ring from spiraling during operation. Specifications require that the cylinder walls have a surface roughness no greater than 16 RMS. Specifications state that the bottom of the groove shall have a surface roughness no greater than 100 RMS and that the walls of the groove have a surface roughness no greater than 250 RMS.

Suit Yourself

FPO, San Francisco—In regard to "Suit Yourself and Survive" Nov. '61. Specifically, I am interested in the graphic display on life expectancy in water printed on page 30.

I am requesting, if possible, the testing procedure and data obtained which was used in the construction of the graph. This information is of particular interest to me and will be used in my divisional training program.

Should you not have the figures available, perhaps you could send a bibliography on the subject.

J. H. WELCH, LTJG
USS TICONDEROGA

• The testing procedure and data obtained which was used in the construction of the graph was obtained:

From the Book "Doctors of Infamy," a summation of experiments conducted by the Germans during World War II on live subjects in areas of exposure to water, electrical currents, G-forces and other effects.

From Merchant Marine sources which listed survivors of ships sunk in the northern Atlantic on Murmansk Run with water temperatures and time exposures.

From Atlantic Fleet reports of aircraft accidents wherein water exposure was experienced.

Raw data was compiled into a graphic chart which was the granddaddy for the present chart. The original research work was done by CDR John R. Myers, who was then a Lieutenant on ComNavAirLant's Staff. The original background work was done in 1952. Ten years later it is still considered valid.

G-Suit Fit

Memphis—A reserve pilot was on a crash program to get his weight down so he could pass his annual physical.

He neglected to tighten his anti-G-suit. As a result on his final flight he blacked out.

To wear an anti-G-suit that doesn't fit, one might as well leave it in the locker.

MORTON GUBIN, M.D.
Flight Surgeon
VMF 124

Ed's Note

Reference the Letter to Editor, p. 46, August APPROACH, "Poopy Suit Airhose Plug," the designer and machinist of the prototype plug for the Mark-V anti-exposure suit as shown in Photo A was Robert C. Walsh, MRCM, of the USS ENTERPRISE CVA(N)65. Congratulations and thanks to Chief Walsh for his interest and work.

Doubts 'Power Settling'

FPO New York—Your article "Instrument Autorotations" in the May '62 issue is appreciated. This is an area which requires much attention and some answers. However, the use of the term "power settling" to describe the abnormally high rate of descent encountered in these various accidents is, I believe, incorrect.

I am intimately acquainted with the two Navy cases mentioned and read with interest the detailed account of the Coast Guard case. In all three accidents, the actions of the pilots, i.e., addition of large amounts of collective pitch, would have greatly aggravated any power settling condition, and sharply increased the rate of descent. Yet, in all three cases, the rate of descent was *almost* stopped prior to ground or water contact.

High recovery altitude and airspeed for hooded autorotation practice prevents adequate simulation. The answer lies in eliminating the flare during instrument autorotation, and an early abort whenever the maneuver is not performed precisely at any stage.

MIKE O'HOPP, CDR
HELANTISUBRON FIVE

• It is our understanding that a Problem Assignment on instrument autorotation is in the mill to be conducted by CDR Pat Sullivan's crew at NATC Pax.

The Coast Guard brief did not state that descent was "almost stopped" when collective was added but that the helicopter settled into the trees "apparently with a low rate of descent." One possible method of recovery from power settling is to add full power which can if the rotor RPM isn't too low begin to remove the vortex ring state. All other factors in the accident point to power settling. It isn't too difficult to attribute the "apparent low rate of descent" to the final twist of the throttle which by commencing to remove the vortex ring introduced more rotor efficiency and lowered the rate of descent somewhat just before impact.

In the two Navy cases mentioned we back down in regard to our loose usage of the term "power settling" but we wouldn't take any bets that a vortex ring state didn't exist when at least one of HSS-1Ns hit the ground.

At this stage of the game we can't see where simulation of an *instrument* autorotation recovery would be any more adequate at 500 feet than at 200 feet.

Safety is Efficiency

Norfolk—To dispel any notions to the contrary, I wish to state that the premise advanced in the article relative to "Aviation Safety or Combat Readiness?" does not reflect the opinions of this Headquarters and the true interests of Marine Aviation.

From the opinions of various writers, it appears that the Aviation Safety Program is the "whipping boy" for attempting to accomplish the training and readiness mission in a manner which will absolutely minimize losses of both

personnel and equipment. I say that this is more of a case of efficiency in management, i.e., getting the best job done with the least cost in human effort, lives, money and material. To increase this efficiency in management we have created the Aviation Safety Officer, whose sole purpose, as a special staff officer, is to recommend to the Commander those measures necessary to achieve peak operating efficiency on the part of personnel and equipment.

If everyone is doing his job efficiently and professionally, being dynamic in his methodology and in constant search for more efficient procedures, there is no job for a safety officer. It is only when all persons are not doing their jobs that a safety officer can justify his existence by uncovering an accident potential and a solution for its elimination. Should such a discovery require a modification of procedure or technique that prevents one accident, saves one life, or prevents a needless expenditure of equipment, then aviation safety is paying a dividend.

I am convinced that changes precipitated by an Aviation Safety Program would have undoubtedly been effected eventually, but not in time to preclude a needless expenditure of men and equipment. Thus, our aviation safety program expedites the results and bridges the gap between potential hazard and safe operational procedures. Aviation Safety and mission readiness are interdependent. Increased combat readiness is our end goal and aviation safety, just like any one of other subdivisions of staff, is helping us toward that goal.

If any commander does not feel that this has been the case, I openly invite submission of proposed changes which can produce the same results that this program has achieved during the past few years.

COMMANDING GENERAL
FLEET MARINE FORCE, ATLANTIC

Test Flight Observers

NAAS, Meridian, Miss.—I would like, if possible, to get a sound interpretation of paragraph 1F of OpNav Inst. 3710.7A, Section VIII, and Part 4 of CNABATRA Inst. 3710.16E which pertains to the crew requirements for a test flight.

The paragraph states that: "a test flight will be conducted by a minimum crew necessary." At this command several personnel have interpreted this as meaning that a *pilot only* will conduct the test flight in a single engine dual seat aircraft of the T28-T34, T2J, F9F-8T type.

This may be just what the instruction means and in the event that it does, I would like to express my views why I disagree.

For example, let us use a T2J. On a test flight in this aircraft the pilot is required to monitor and record instrument readings at 5, 10, 15 and 20,000 feet. Such items as EGT, Fuel Flow, Airspeed and Cabin Altimeter readings are monitored and recorded on the test flight card.

Now at the speed the aircraft is climbing, if the pilot spends a considerable amount of time recording these indications, WHO is keeping a lookout for another aircraft? He is boring holes in the sky without keeping a constant lookout for other aircraft and is therefore greatly increasing the chances of a mid-air collision.

It is my feeling from a safety point of view that an extra pair of eyes in the rear seat could greatly reduce the chances of such a mishap.

In reference to the publication "Cockpit Crossfeed," dated 31 October 1961, Accident Brief 3 for the AD *Skyraider* in which a midair collision occurred resulting in ALFA damage to both aircraft and serious injury to one of the pilots, simply because both pilots were engrossed in performing and recording data on test flights, and neither pilot saw the other: This in my opinion is inexcusable. The comment of the Safety Center was that in single seat aircraft a chase plane should accompany a test flight, and in dual seat aircraft an observer should accompany the test pilot in order to maintain an adequate visual lookout. I agree 100% on this and I believe if this were practiced, the possibility of mid-air collisions would be greatly reduced.

I also feel that a qualified observer should be present because of the possibility of a malfunction of equipment or instruments that does not always occur in the front cockpit. A good example of this occurred at this command when a plane was test flown by a pilot with no one in the rear seat. Upon completion of the flight, the aircraft was upped and several days later this same plane was scheduled for an instrument check hop. It never left the ground due to the fact the rear cockpit gyro horizon was inoperative. This instrument was known to be functioning properly when the plane came out of check and if the rear seat had been occupied during the test hop, this malfunction could have been caught and corrected before the plane was flown again. This again seems to me like an unnecessary occurrence which resulted in a plane not being able to complete its assigned mission because of a malfunction that went several days unnoticed when it could have been corrected right away.

We, here at NAAS, Meridian Quality Control Division, have devised a procedure which so far has worked excellently and has met the satisfaction of the maintenance test pilots.

Our method on test flights in our T28 and T2J aircraft is that a Master Inspector from Quality Control will monitor and record all the required instrument readings during the flight with a double check on the front cockpit readings by the pilot. Therefore, the pilot has only to look at the particular instrument we want a double check on for a split second and it doesn't interrupt his visual lookout for other aircraft for any length of time. We also inform the pilot, item by item, of the other required checks to be made so he may accomplish them. So, therefore, at all times an adequate visual lookout is maintained while at the same time a close accurate check is made of all items on the test flight card and any discrepancies in the rear cockpit will be noted and can be corrected upon completion of the flight.

There is one final aspect to the reason for a Quality Control man flying on a test hop. If a man knows he will be flying in the plane he is inspecting, his methods of inspecting that plane and insuring its airworthiness will be exacting. Of course, he should realize even if he is not flying in the plane, his inspections should be of the highest calibre, but I still maintain the fact that if he knows he will be in that plane, then he will realize that fact even more. At the same time the quality of maintenance performed on aircraft will be at its highest and will instill a greater feeling of confidence in the pilots who will be flying these planes.

I would appreciate it, if you would publish all or any part of this letter that I have sent you and invite any pros and cons to the subject from different commands.

GEORGE E. LACROIX, AE1-P1
NAAS Meridian A/C Maintenance
Quality Control

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approach

THE NAVAL AVIATION SAFETY REVIEW

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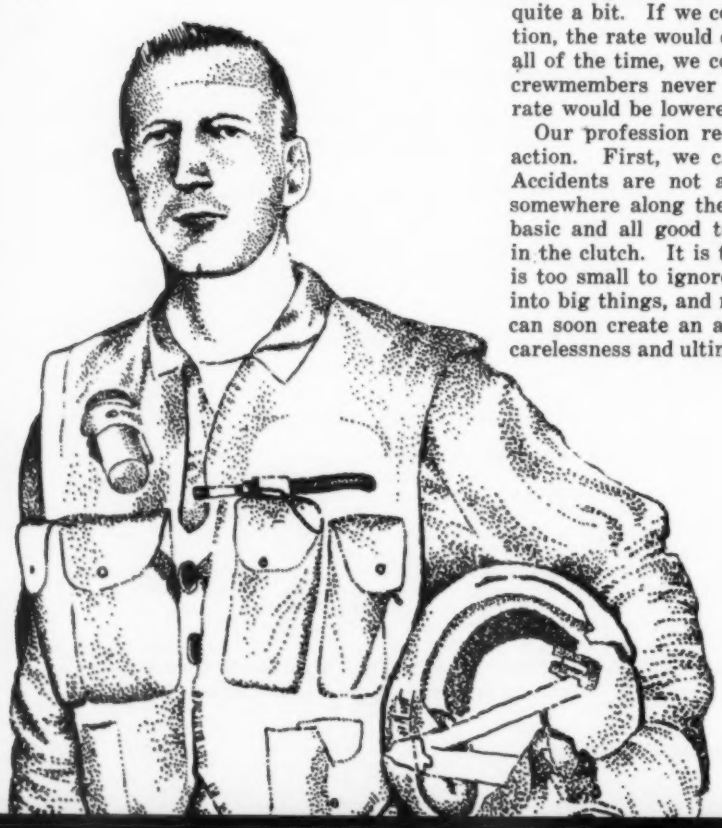
Our product is safety, our process is education, and our profit is measured in the preservation of lives and equipment and increased mission readiness.

On Being A Professional



THE human element enters into almost every accident, why? Well, let's take the definition of an accident. An accident is an undesigned, sudden and unexpected event. It disrupts the smooth fulfillment of a carefully planned operation.

In every accident there are two important factors—the machine and the man. True, there are equipment failures which will cause disaster irrespective of the qualifications of the man involved. However in the great majority of cases, both elements are involved to some degree. Few accidents are the result of any one single factor. Such accidents are the results of combinations, which compound to eventually exceed the ability of the pilot and crew.

To achieve genuine safety we must have teamwork. That begins with supplying good, well-maintained aircraft for the highly trained, conscientious aviator to fly. It continues only by maintaining the standards we know to be necessary. If every component part of an airplane would function all of the time as it was designed, we could probably cut our accident rate down quite a bit. If we could maintain an airplane to absolute perfection, the rate would drop still lower. If the weather were CAVU all of the time, we could whittle it still more. And, if pilots and crewmembers never made a bad decision or mistake, then our rate would be lowered to the absolute minimum.

Our profession requires that we translate safe thinking into action. First, we can ignore the problem or meet it head-on. Accidents are not accidental. They happen because someone, somewhere along the line has failed to do a job. Teamwork is basic and all good teams must be training or they break down in the clutch. It is the little things that count and no one thing is too small to ignore. All "little things" if neglected will grow into big things, and more particularly, the neglect of little things can soon create an attitude that will in time develop into sheer carelessness and ultimately into fatal complacency.

—CNAVanTra Flight Safety

CNO AWARD WINNERS

Winners

VF-193	VMA-222	CVSG-55	HU-811
VF-33	VAH-6	VS-33	H&MS-24
VA-831	VF-121	VS-662	VT-21
VMF(AW)-451	CVG-15	VR-24	VT-30
VMF-313	VP-11	VMGR-352	VT-9
VA-216	VP-724	VR-742	VT-1
VMA-224	VP-40	AEWBarRonPac	VAW-33
VA-196	HS-1	HS-4	VFP-62
VA-813	HMM-773	HMM-263	HU-1

Runners-Up

VF-31	VF-174	VR-VR-21	VU-2
VF-154	CVG-7	VMGR-252	VFAW-3
VMF(AW)-115	CVSG-54	VW-11	VX-4
VA-76	VP-4	VMO-1	VMCJ-3
VMA-223	VP-31	HS-13	
VA-35	VP-49	HMM-364	
VAH-9	VS-32	H&MS-15	

Special Awards

VR(F)-31 NATTC/NAS Glynco USS Valley Forge

Flatley Awards

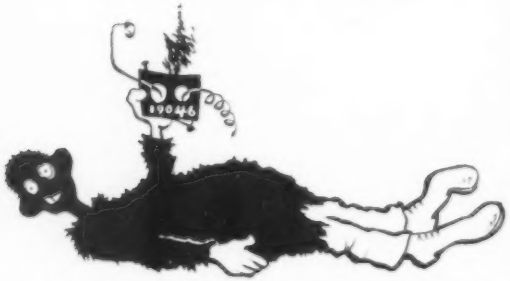
CVA	CVS
USS Independence	USS Essex

ELECTRO COMMANDMENTS

Here are some excerpts from the Ten Electro Commandments as published in VFP-62's Newsletter. While handling electricity is no joke, this bit of humor should help us all to remember that with electricity, safety is first:

Cause thee the switch that supplieth large quantities of juice to be opened and thusly tagged that thy days may be long in this earthly Vale of Tears.

Tarry thou not amongst those fools who engage in intentional shocks for surely they are among the non-believers and are not long for this world.



Take care that thou useth the proper method when thou taketh the measure of a high voltage circuit so that thou dost not incinerate both thee and thy test meter, for verily, thou hast no plant account number and can be easily surveyed, the test meter dost have one and as a consequence bringeth much woe unto the supply office.

Trifle thee not with radio-active tubes and substances, lest thou commence to glow like a lightning bug, and thy wife be frustrated nightly and have no further use for thee except for thy wages.